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TWENTY-SECOND ANNUAL REPORT

OF THE

DEPARTMENT OF PUBLIC HEALTH OF MASSACHUSETTS

REPORT OF THE PUBLIC HEALTH COUNCIL

At the end of the fiscal year closing November 30, 1936, the Department of Public Health was constituted as follows:

Commissioner of Public Health . . . . HENRY D. CHADWICK, M.D.

PUBLIC HEALTH COUNCIL

GORDON HUTCHINS, 1937
FRANCIS H. LALLY, M.D., 1939
SYLVESTER E. RYAN, M.D., 1937
RICHARD M. SMITH, M.D., 1939
RICHARD P. STRONG, M.D., 1938
JAMES L. TIGHE, B.A.Sc., C.E., 1938

Regular monthly meetings of the Department have been held throughout the year, the August and October meetings being held at the Lakeville and Westfield State sanatoria respectively. An additional meeting was held on the day following the regular June meeting of the Council, at which time an inspection was made of the sewer outlets of Boston Harbor and of the shellfish treatment plant at Plymouth. In connection with the October meeting an inspection was made of the new Quabbin Reservoir and Dam of the Metropolitan water supply.

The Committee on Sanitary Engineering, composed of Mr. Tighe, Chairman, Mr. Hutchins and the Commissioner, has met each month prior to the regular meeting of the Council and submitted its recommendations on all matters of sanitary significance.

Several investigations have been made by direction of the 1936 Legislature: Chapter 4, relating to tentative rules and regulations to protect the purity of interstate waters used as sources of public drinking water supply; Chapter 42, relative to the use of Wading River as a source of water supply for the city of Attleboro; Chapter 49, relative to an investigation in cooperation with the Federal Works Progress Administration of the sanitary condition of the Blackstone, Hoosick, Housatonic and Nashua rivers; and Chapter 18, providing for an investigation by the Metropolitan District Commission, the Metropolitan District Water Supply Commission and this Department relative to setting off a portion of Lake Cochituate in the town of Natick for boating and fishing.

The Council has also carried out its regular duties as imposed by law, including the approval of regulations prepared by the Board of Registration of Hairdressers; approval of changes in the rules and regulations of the Board of Examiners of Plumbers; approval of a prophylactic remedy for the treatment of the eyes of infants at birth; granting of licenses for the conduct of dispensaries; approval of appointments at state and county tuberculosis institutions; approval of plans for construction and equipment at tuberculosis sanatoria; adoption of rules and regulations for preventing the pollution and securing the sanitary protection of water supplies of several communities; approval of rules and regulations relative to cross connections between public water supplies and fire and industrial water supplies; approval of out-of-state shellfish dealers who have been approved by their respective state shellfish authorities and the United States Public Health Service; revision of the regulations relating to the pasteurization of milk and of the regulations relative to certified milk; and approval of a contract between Hampshire, Hampden, Berkshire and Franklin counties providing for the joint use of the Hampshire County Sanatorium. Ten public hearings were held as provided by statute on the approval of the taking of land for the protection of water supplies, the approval of plans for sewage disposal systems, appeals from the action of local milk inspectors in refusing to grant licenses to certain dealers, and pertaining to the

labeling of methyl or wood alcohol. On August 10, 1936, under the authority of Section 4 of Chapter 17, General Laws, the Council voted to create a new division within the Department, to be called the Division of Genitoinfectious Diseases.

At a meeting of the Department on January 19, 1937, the Commissioner of Public Health presented to the Council a report of the doings of the Department for the year 1936, and after discussion it was voted that this report, together with the foregoing brief summary of the activities of the Public Health Council, be approved and adopted as the report of the Department of Public Health for the year 1936.

TWENTY-SECOND ANNUAL REPORT OF THE COMMISSIONER OF PUBLIC HEALTH

To the Public Health Council:

Gentlemen: I have the honor to submit herewith my annual report for the fiscal year ending November 30, 1936, although, as in the past, all figures except those relating to the budget will be given for the calendar year.

I. General Matters

This has been an exceptionally busy year for the Department. In addition to the usual work carried on by the different Divisions, new legislation placed additional duties and responsibilities on the Commissioner.

Chapter 247 of the Acts of 1936 provided for an Approving Authority consisting of the Secretary of the Board of Registration in Medicine, the Commissioner of Education, and the Commissioner of Public Health, to pass on the qualifications of applicants for registration as qualified physicians. This requires the setting up of standards for colleges giving pre-medical courses and for medical schools in order that their graduates in medicine may be eligible to take the examination for a license to practice in the Commonwealth.

Chapter 144 of the Acts of 1936 provided for the payment of military and other emergency expenses in safeguarding the lives and preserving the health and safety of the inhabitants in the areas of the Commonwealth damaged by floods, and carried an appropriation of $750,000. The administration of this relief was carried out under the direction of a board consisting of the Adjutant-General, the Commissioner of Public Health, the Commissioner of Public Welfare, and the Commissioner of Public Safety. The board had many meetings to pass on claims brought by communities and individuals who suffered damage as a result of the floods.

Chapter 430 of the Acts of 1936 amended certain provisions of law relative to the determination and establishment of minimum fair wage standards for women and minors. The Minimum Wage Commission thus established was placed in the Department of Public Health under the control of the Commissioner of Public Health, and consists of the Commissioner of Labor and Industries who shall act as Chairman, the Commissioner of Public Health and the Commissioner of Public Welfare. The reason for this change in the statute, taking the Minimum Wage Commission out of the Department of Labor and Industries and placing it under the Department of Public Health, was because a similar law in New York State had been declared unconstitutional by the United States Supreme Court. It was reasoned that if a minimum wage law was based upon the assumption that unreasonably low wages would result in impairing the health of the workers it would be considered a health measure and the Courts would uphold its constitutionality. After the passage of the act, the Commission was organized and new wage boards have been appointed representing the employer, the employee and the public to consider the twenty-two trade classifications. When these boards report their findings and recommendations, hearings are held by the Commission who approve or disapprove the recommendations relating to wage scales and hours of labor for the different trades.

Chapter 11 of the Resolves of 1935 provided for a Commission of twelve members to be appointed by the Governor to make an investigation of the public health laws and policies of the Commonwealth. This was organized in August, 1935, with the Commissioner of Public Health as Chairman. The Commission then appointed

thirteen committees to consider the following subjects: Public Health Practices and Procedures; Communicable Diseases; Tuberculosis; Syphilis and Gonorrhea; Sanitation; Maternal and Neonatal Hygiene; Child Hygiene; Public Health Nursing; Oral Hygiene; Adult Hygiene; Hospitals; Mental Hygiene; and Occupational Hygiene. It was soon realized that the report to be of value would take a longer time than was granted to complete the study. A preliminary report was made to the Legislature in December, 1935, and an extension of time requested. This was granted, and the final report was filed with the General Court in December, 1936. This comprised a volume of over three hundred pages with recommendations for changes in legislation, involving the repeal of laws which have become obsolete, the amendment of others, and some entirely new statutes. To carry out these recommendations, fifty-eight bills have been filed with the report. This study of the laws pertaining to public health with a view of bringing them into line with present day practices was very much needed. The 161 persons selected to serve on the various committees because of their knowledge and interest in health problems deserve the gratitude of the Commonwealth for the earnestness with which they took up the task and carried it through regardless of personal inconvenience and sacrifice of valuable time. No similar study and report on sanitation and other matters affecting the health of the people of the Commonwealth has been made since the report of the Sanitary Commission of Massachusetts, published in 1850. This came about through an act of the Legislature of 1849 authorizing the appointment by the Governor of a Commission of three members, of which Lemuel Shattuck was Chairman. Eighty-six years after the report made by that Commission, the Massachusetts Health Commission has filed its report. Copies will be ready for distribution early in 1937, and it will be well worth careful perusal by all those interested in public health.

Social Security.—The Federal Social Security Act of 1936 made funds available to supplement the public health work of all the states. Massachusetts has benefited to the extent of a grant of over $400,000, and the passage of an enabling act gave the Department authority to receive and administer these funds. The money is paid to the State Treasurer and Receiver-General in quarterly installments in accordance with an annual budget made up by the Department and approved by the Federal authorities. After its receipt by the State Treasurer it is expended under the same laws and regulations as are other State funds. This money comes to us from two sources: the United States Public Health Service under the Treasury Department and the Children's Bureau of the United States Department of Labor. The amount allotted by the United States Public Health Service to each state is dependent on the population, special health problems, and financial needs. For service to crippled children each state is allotted $20,000 and the remainder is allotted on the basis of need, taking into account the number of crippled children in need of such service and the cost thereof. The sum allotted aside from the $20,000 must be matched by State appropriations. We were permitted to use for matching purposes the money expended at the Lakeville State Sanatorium for the care of children crippled from tuberculosis. The conditions for allotting funds for maternal and child health were as follows: (a) $20,000 to each state; (b) an allotment in proportion to live births; (c) the need of the individual state. The sums under (a) and (b) had to be matched by State appropriations for similar purposes.

The grants approved for Massachusetts by the United States Public Health Service for the Federal fiscal year July 1, 1936 to June 30, 1937 amounted to $247,464.00. This was allotted by the Department to be used as follows:

Division of Administration	$27,700.00
Division of Adult Hygiene (Cancer)	6,810.00
Antitoxin and Vaccine Laboratory	23,320.00
Division of Communicable Diseases	8,210.00
Division of Food and Drugs	5,080.00
Division of Sanitary Engineering	15,820.00
Division of Tuberculosis	9,600.00
Wassermann Laboratory	4,640.00
Control of Gonorrhea and Syphilis	45,342.25
Barnstable County Health District	2,210.00
Berkshire Health District	20,085.75

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Franklin County Health District	$12,500.00
Nashoba Health District	13,940.00
Training Public Health Personnel	31,806.00
Development of District Milk Laboratories in Rural Areas	20,400.00

The grant from the United States Department of Labor through the Children's Bureau, amounting to $84,676, for service to crippled children is being administered through the Division of Administration. The grant of $78,946 for maternal and child health is being used for research and to enlarge the scope of the many activities carried on by the Division of Child Hygiene.

Altogether the Commonwealth has been granted $411,086 of Federal funds for the improvement of health and the prevention of disease. This is equal to approximately one half of the State appropriation for the Department exclusive of the amounts needed for maintenance of the four State sanatoria for tuberculosis and the cancer hospital, and to pay the subsidy for the hospitalization of tuberculosis patients in county and municipal sanatoria.

We have been able with this supplementary fund to increase the personnel of all the Divisions and provide new equipment for offices and laboratories. A considerable sum also was used to provide scholarships for public health courses at Harvard, Massachusetts Institute of Technology, Simmons and Columbia for physicians, nurses and sanitarians. Persons in public health work or who desire to enter this field have an excellent opportunity to better qualify themselves for positions as health officers, sanitary inspectors, and public health nurses by taking these courses.

Union Health Districts.—The Southern Berkshire Health District has been making progress and the advantages of having trained personnel in charge of the health work are being recognized by adjacent areas. Hinsdale, Peru and Washington voted to join the District during the past year. This augurs well for the future as it is hoped that all the towns in the county will eventually unite in one Health District. With this in view the District decided to drop the word "Southern" from its official name and become the Berkshire Health District. To further this plan the Medical Director was appointed the District Health Officer and the supervising nurse was made the consultant for nursing service to represent the Department in the county.

Nashoba Health District.—This comprises ten towns centering around Ayer. Pepperell as a result of the extensive damage done by the flood and the necessity for strict economy voted to withdraw. Other adjoining towns are showing much interest in the District plan and it is expected that some of them will vote to join when elections are held in the spring. This is the first year this District has financed its own activities. The Commonwealth Fund having withdrawn its support, responsibility now rests with the member towns. A small grant of Social Security funds was made to provide some additional personnel so that demonstration work could be carried on in towns that evince an interest in the union plan.

Barnstable County Health District.—This is the only County Health District in the State, but it has not been able to carry out a complete health service because of lack of funds. With Social Security money this deficiency has been corrected. A well-equipped milk laboratory has been provided and additional nursing service made available.

Franklin County.—An attempt was made to obtain the consent of the towns of the county to unite and form a Health District. The population of the county is approximately 50,000. Most of the towns have so small a population that they cannot afford the services of trained health workers. It seemed an ideal area in which a health department on a county-wide basis could be set up to function with great advantage to the people at a minimum expense. Social Security funds were offered to supplement the contribution of the towns on a fifty-fifty basis. Only six of the smaller towns, having an aggregate population of 3,300, voted to accept this offer. As this was too small a group to function as a unit it was decided to set up a branch office of the Department with a milk laboratory financed by Social Security funds and provide service to those towns in the county that would appoint as their own officials the State Health Officer and Sanitary Inspector.

We will have an opportunity to watch results in the three different types of Health Districts now functioning in Massachusetts: the county plan in Barnstable

County, the voluntary union of towns in Berkshire and Nashoba, and the branch office of the Department operated at Greenfield for Franklin County.

District Health Officers.—With the appointment of Dr. Harold W. Stevens as District Health Officer in Berkshire County and the assignment of Dr. Walter W. Lee to Franklin County, we now have the eight Health Districts provided by statute. There have been some minor changes in the boundaries of the Districts so as to have them follow county lines as far as practicable.

It is with much sorrow that I record the death of Dr. Harold E. Miner who was District Health Officer in the Connecticut Valley for twenty years. He was able, efficient and tactful, and gave unsparingly of his time and strength to render aid in emergencies and put into effect measures that would protect the health of the people in the District. As Health Officer he was outstanding. His methods were based on approved public health practices and carried out without ostentation with the hearty cooperation of the people involved. He was a most loyal friend.

Milk.—No extensive outbreak of milk-borne diseases occurred during the year, but there was a definite increase in the number of reported cases of undulant fever, probably due to better recognition of this disease by physicians. There was one case of typhoid fever, probably spread through milk purchased from a known typhoid carrier who bought a cow and started selling milk to a few of his neighbors. The present statute permits producers of less than twenty quarts to sell direct to consumers without procuring a milk license, and therefore a typhoid carrier, if uncooperative, can go into that business and infect his customers.

Pasteurization.—The number of communities requiring the pasteurization or certification of all milk sold locally has increased from twenty-five to thirty-two and three other cities have adopted similar regulations which will become effective within a few months. These thirty-five cities and towns, with a total population of 2,350,000 or one half the population of the Commonwealth, have recognized the danger of using raw milk and have been far-sighted enough to protect their citizens from milk-borne diseases. With the prevalence of Bang's disease (contagious abortion) so widely distributed throughout the dairy herds of New England, the risk of contracting undulant fever is a real one and can only be avoided by using milk that has been made safe by pasteurization.

Board of Health Records.—Realizing the inadequacy of the records kept by many boards of health, the Department for three years has offered the services of one of its staff to aid local officials in improving their system of record-keeping. Many towns and cities have availed themselves of this service and have been able to carry out a much more systematic diphtheria immunization program. This work was financed for three years by the Commonwealth Fund and it will now be continued by Social Security funds.

II. Communicable Diseases

We have been fortunate this past year in having the lowest case rate for diphtheria, infantile paralysis, and rabies, and the lowest death rate for whooping cough, in the history of the State. There has, however, been a sharp increase in the incidence of meningococcus meningitis and the first increase in typhoid fever since 1930. The total number of cases of communicable disease reported during the year was 106,269 as compared with 110,395 for 1935.*

Prevalence of Certain Diseases

Anterior Poliomyelitis (Infantile Paralysis).—There have been but 51 cases and 10 deaths reported, which is the lowest reported level in the history of the Commonwealth, the previous minimum number of cases having been 61 in 1932, and the previous minimum number of deaths being 9 in 1934. This low incidence of poliomyelitis in Massachusetts was characteristic also of the northeastern section of the United States. The actual incidence of the disease as compared with other years was actually less than is shown from these figures owing to the fact that there have been many non-paralytic cases included which, according to criteria of other years, would not have been called poliomyelitis. For example, there was a definitely localized outbreak at St. Mark's School in Southborough from which 19 cases were officially reported. These cases were unquestionably caused by contact from one

* The death figures used in this report are estimated on the basis of ten months' experience.

boy to another, there being no evidence whatsoever to suggest any other mode of infection. In addition to those cases which were reported, there were numerous others in boys who returned to their homes, where a diagnosis of poliomyelitis was made. In several of the cases the illness lasted but a day or so and lumbar puncture findings during the height of the illness were absolutely negative. Unquestionably these represented true cases of mild poliomyelitis virus infection. The records show that these cases were almost as numerous as was measles under comparable circumstances. It has been known for years that coincidental with a poliomyelitis outbreak there were many cases of an undiagnosable illness which probably were such mild infections, but these have never been as accurately enumerated as at this time.

During the year the new system of reporting so as to distinguish between paralytic and non-paralytic cases has been given a first trial. While fundamentally correct in theory, it has not been highly successful in practice due to the failure of many boards of health to distinguish between the two types of cases in their reports. Of the 51 cases reported 32 were paralytic.

Diphtheria.—The reported incidence of diphtheria fell to the lowest figure in the history of the State with only 320 cases reported as contrasted with 390 in 1935. It is to be regretted, however, that there was not a corresponding decline in deaths. There were 26 deaths in 1935 as compared with 28 in 1936. The smaller number of reported cases was in part due to the fact that some communities discontinued their former practice of reporting carriers as cases.

The city of Lowell continues to have a very high case rate. The localized outbreak in Chicopee at the end of last year came to an abrupt end about the middle of January, which was about one month after the completion of a rather extensive immunization program in that city. An outstanding change in local diphtheria situations is found in Somerville where the 1935 figure of 21 cases and 2 deaths has declined to 5 cases and no deaths so far this year. This has been brought about by the first sustained immunization program ever carried on in that city. Figures so far available indicate that over 8,000 were immunized in 1935 and 6,200 in 1936. Springfield continues with the best record of the larger cities in the State, having had no case of diphtheria since August, 1935. Holyoke is to be congratulated on not having had a single case of diphtheria for the past three years.

Notwithstanding the high diphtheria rate in Lowell, the Board of Health of that city voted to discontinue all immunization clinics and leave the work entirely to physicians. This vote, however, was later rescinded and the work resumed though not on as extensive a scale as in many other communities. At the end of the year immunization programs had been conducted at one time or another in every community in Massachusetts except the town of Savoy. Several communities have neglected to continue immunization programs and in such communities a large susceptible group has developed. Notable among these at the present time are the towns of Hanson, Southborough and Montague. Boards of health should, as a part of their regular budget, include an item to cover the cost of an annual immunization program.

The Department has continued to advise against the use of alum precipitated toxoid and to recommend three doses of toxoid at three-week intervals. This attitude has been based upon the uncertainty of the immunizing effect obtained with less than three injections; also because the use of the alum precipitated toxoid material may result in abscess formation. It is becoming apparent that the position of the Department was well taken in refusing to lessen the number of injections. Recent studies from Ohio show that of over 500 children Schick negative after one dose of alum toxoid, over 55 per cent had lost this immunity within two years. Similar studies in Detroit of those children who contracted diphtheria during 1935 showed that some 40 per cent had been presumably immunized by either two doses of toxoid a month apart or more recently by one dose of alum precipitated toxoid. Study of an equally large group in Massachusetts showed that less than 10 per cent had presumably been immunized and that in at least one half of these there was doubt as to the diagnosis owing to the absence of confirmatory cultures. It is thus apparent that there are not yet adequate grounds for reducing the number of injections below three without incurring an unnecessary risk of failure in immunization.

Gastro-Enteritis.—The past year has seen the usual number of outbreaks of gastro-enteritis. Some of these appear to be gastro-intestinal infections spread by contact and presumably respiratory in origin. This type of disease is never severe, and is frequently called intestinal grippe for want of a better name.

Specific outbreaks of gastro-enteritis following banquets or other meals continue to occur. Several such have been investigated during the past year without yielding any very definite results. It is interesting to note that the majority of these follow a meal or banquet where poultry is served. Another group of cases occur following the eating of pastry, usually filled with whipped cream or a custard. The recent work of Dack and his associates in Chicago has reopened the entire question of food poisoning through the observation that many organisms would produce toxins only if grown on a certain specific medium. It is thus apparent that such organisms as staphylococci, which are so frequently found in creams, may be harmless in some things, but if they grow in other foods might produce potent toxins.

Influenza.—The past year has been remarkably free from scares and rumors of influenza, both in Massachusetts and in other parts of the country.

Malaria.—Eleven cases were reported during the year, all but one of which were unquestionably infected outside Massachusetts.

Measles.—This disease, which was extremely low throughout Massachusetts during 1935, became quite prevalent in the eastern part of the State late in the spring when it reached a higher peak than for several years. Although the number of cases increased above that of 1935, there was an actual decrease in the number of deaths, and the case fatality rate reached the lowest level ever recorded in the history of the Commonwealth. This in part may be due to better reporting of cases, but it seems unlikely that this is the entire explanation. It is extremely significant that even with measles much more prevalent during the spring than in former years and pneumonia also more prevalent there was a striking decline in the case fatality of the disease during this period. It seems probable that better medical and nursing attention to the small children is the most plausible explanation.

Meningococcus Meningitis.—With 200 cases and 117 deaths reported, the morbidity rate for this disease reached the highest level since 1919 and the highest death rate since 1920. The high incidence of this disease is but a part of the general increased prevalence throughout the eastern part of the United States. There are normal fluctuations in the incidence of this disease which occur in waves of some five years' duration. It reached the lowest level ever recorded in the State in 1933, increasing slowly through 1934 and 1935. The end of 1935 saw a rapid increase which was experienced with full force during the winter and spring of 1936. An extremely serious situation developed at the prison colony at the Bridgewater State Farm and at the Long Island Hospital in Boston. At the State Farm some 14 cases and 6 deaths occurred. In addition, 3 cases developed in persons who had recently been discharged from the prison. Except for one case in Natick who had intimate contact with one of this latter group after his discharge, there is no evidence that any case of meningitis developed from exposure to a person discharged from the State Farm. At the Farm it was limited to the prison section and was due in large measure to the high degree of overcrowding that existed in this group. In the control of the disease, reliance was placed upon measures to reduce the overcrowding. The outbreak at Long Island Hospital involved 19 persons of whom 14 died. In contradistinction to the handling of the Bridgewater outbreak, the control of the Long Island situation was handled through cultural methods by the Boston Board of Health with far stricter isolation and quarantine procedures. Viewed in retrospect there is no evidence that one method was in any way superior to the other, both being equally ineffective in preventing the spread of the disease within the exposed group.

Pneumonia, Lobar.—The reported incidence of lobar pneumonia during the past year showed a marked increase over the level of the previous year, reaching the highest figure reported since 1925. At the same time the death rate also increased to the highest figure since 1929. To what extent the increase in reported incidence may be a measure of better reporting cannot be determined, but the increase in deaths indicates that the disease was actually more prevalent than for the several

preceding years. A study of the incidence of various types showed that during the winter of 1935–1936 Type I increased rapidly throughout the fall and early winter, reaching a peak in January following which there was an actual decline in the incidence of this type. This peak in January was reflected in the high death rate which was for that month the highest throughout the winter. The Type II cases ran roughly parallel to Type I. Coincidental with the decline of the incidence of Type I infections there was an actual and relative increase in the prevalence of Type V pneumococcus infections. The seasonal incidence of Types VII and VIII roughly paralleled that of Type V though at no time reaching the same level. Further study in future years may well show that some of the seasonal fluctuations in pneumonia are due to coincidental fluctuations in the incidence of specific types. This is a point which needs intensive study in the future and for which the laboratory records now accumulating will be of inestimable value.

Nineteen hundred and thirty-six was the first year during which the State had completely taken over the work of the Pneumonia Study previously carried on by the Commonwealth Fund. The Department has now taken over the manufacture and free distribution of pneumonia serum. Massachusetts thus becomes the first State in the Union to have put the use of pneumonia serum on this basis, which has been made possible through the establishment of typing laboratories in hospitals throughout the Commonwealth, the serum being furnished to these hospitals to be issued only on the basis of positive laboratory reports. While unquestionably there are many cases of pneumonia today which might well be treated with serum which are not receiving this form of treatment, it is apparent that there has been an increase in the interest in and use of antipneumococcus serum on the part of the medical profession. To what extent the use of the serum has affected the death rate of the disease cannot be determined at the present time. There are many immeasurable factors which affect this rate, but the use of the serum has unquestionably been responsible for the saving of many lives.

Rabies.—The reported incidence of rabies in animals reached the lowest level in years and possibly the lowest level in the recent history of the State. During the first few years that rabies was reported, it was done so inadequately that no judgment can be formed from those early figures. The decline in 1936 was very striking with only 102 cases reported as compared with 278 in 1935. The cases have occurred very largely in the north metropolitan area and with an independent focus in Worcester and neighboring communities. During the early part of the year the disease was abnormally prevalent in Lawrence. As the year ends there are apparently four active foci in the State, one around Chelsea, Revere, and Winthrop, another in Winchester and Arlington, the third in Andover and North Andover, and the fourth around Phillipston and Templeton. No human cases of rabies occurred during the year.

To what extent the dog immunization clinics might have been responsible for the reduction in rabies cannot be determined at the present time. It is apparent, however, from data already available that they have played at least some part in reducing the disease, and that in those communities where such clinics have been conducted the disease has occurred very selectively in those dogs not immunized. Failures of immunization have, however, occurred, but these have been infrequent enough to warrant the conclusion that dog immunization is a valuable adjunct to our rabies control measures. It is probably even more important than in other states as the absence of provision for area quarantine in Massachusetts very definitely limits the effectiveness of restraint orders. Dog immunization clinics have been conducted in twenty-nine communities.

Scarlet Fever.—The past year has seen a slight increase in the reported incidence of scarlet fever although the death rate declined to the lowest figure ever recorded in the history of the State with only 44 deaths reported. Studies of scarlet fever immunization using a formolized toxin have been continued and extended during the year. During the five years of these studies, the Department has Dick tested over 20,000 children and immunized over 10,000 of these with this solution. These studies have been carried on in the children's tuberculosis sanatoria and in the schools for the feeble-minded. In these two groups of institutions the immunization has been a routine procedure for a number of years. Community studies also have been carried on in Wellesley, East Bridgewater, Bridgewater, Shirley, Holliston, Greenfield, Gloucester, Rockport, Leverett, Shutesbury, and the Berkshire Health District.

In addition to these studies, immunization in the parochial school system has been carried on in Worcester for over two years, and during the past year was extended to the cities of Fall River and Springfield. It has become apparent that the most valuable results are going to come from those places, Fall River, Springfield, and Worcester, where a relatively small fraction of the children have been immunized. In other communities where the immunization has been offered to all children in the community so large a percentage of the total have availed themselves of the opportunity that it has become impossible to gather very conclusive data as to the value of the material. In all of these communities the incidence of the disease has been abnormally low. This is probably significant, but there is also the chance that these communities might have had a low incidence for several years even without immunization, especially when it is remembered that these and other communities in the past have gone for several years with a virtual absence of the disease only to have it occur at a later date. Studies of a smaller sample of the population distributed throughout a city will therefore yield more conclusive data as it cannot possibly interfere with the general prevalence of the disease. The data so far available continue to indicate a very considerable degree of protection from this immunization method.

Septic Sore Throat.—One hundred and fifty-three cases of this disease were reported during the year. Probably all of these were sporadic infections spread through contact. There was no evidence at any time to suspect that milk might have been responsible for the spread of the disease.

Smallpox.—For the fourth consecutive calendar year there has not been a single case of smallpox reported in the Commonwealth. The last case occurred in the Fitchburg outbreak in February, 1932. That the State has been free from this disease for approximately five years is a striking tribute to the efficacy not only of vaccination but also of the law requiring vaccination as a prerequisite to school attendance. Figures as to the percentage of children protected by vaccination in the various parts of the State vary considerably, but usually run above 95 per cent. This is made possible not only by strict enforcement of the vaccination law in the public schols, but also through the voluntary enforcement of a vaccination requirement in the parochial and many other private schools.

Tuberculosis.—The reported incidence of pulmonary tuberculosis reached the lowest level in the history of the State, although that of extra-pulmonary showed a slight increase. The death rate for both forms reached the lowest level ever recorded, and has been cut in half in a period of ten years. The case-finding program which has been carried on for many years and the provision of enough beds to hospitalize the cases as found must be given credit in large measure for this most satisfactory result. The case-finding program in the schools, which has been continued in the junior and high school grades, shows a lessened incidence of infection. The number of applications for the admission of children has fallen off markedly so that now there are many vacant beds in the sanatoria devoted to their care.

State Sanatoria.—There was a slight decrease in the number of patients, but a slight increase in the total number of patient days of treatment. Although the forty-eight hour law went into effect during the fall of 1935 its influence on the per capita cost was more apparent during the past year. The greater increased cost at the Westfield State Sanatorium than at the other institutions was because throughout the year they had a large number of vacant beds. Out-patient and consultation clinic examinations of patients referred by physicians and boards of health continue to be one of the most important activities of the State sanatoria. During the past year 6,670 such examinations were made by the four sanatoria.

Unusually severe winter weather delayed construction on the new cancer-tuberculosis unit at Westfield until nearly the first of April. The new storehouse has been completed and accepted. Construction, plumbing and plastering were completed at the nurses' home, and the building should be ready for acceptance by the first of April. The hospital building has been closed in, and the plumbing was nearly completed at the end of the year. The building will probably be ready for acceptance about the first of June, 1937, and ready for occupancy the latter part of the summer. $364,275.00 has been received from Federal sources, which will represent about one third of the cost of construction and equipment.

Typhoid Fever.—For the first time in six years there has been an increase in the reported incidence of the disease though the number of deaths was the same as in 1935. The increase in cases was due entirely to a single outbreak in Lowell. If these were subtracted from the total, the number of endemic infections would have shown a slight decline below the 1935 level. Fortunately in this outbreak of 38 cases there was not a single death. This outbreak, which was the largest in the State since the Saxonville outbreak of 1930, followed a banquet, some of the food of which was sent to an orphanage. That the infection was unquestionably associated with the food served at the banquet was shown by the occurrence of typhoid fever cases at the orphanage, among Lowell residents at the banquet, and among residents of other communities who were in Lowell only for the banquet. While the source of infection could not be conclusively proved, it seems probable that it could be traced back to a mild case of typhoid in an employee of the milk company delivering milk to the caterer who served the banquet. That this employee was probably a missed case of typhoid possibly modified by previous inoculation at the time of the flood was shown by the isolation of typhoid organisms from his stools on two separate occasions. It would appear most likely that the infection had been introduced in the catering establishment through his handling the cap of the milk can, where the organisms stayed alive for a number of hours and were then transferred to the hands of the kitchen employee who opened the cans, and from his hands directly to the turkey which he was slicing. It was demonstrated that organisms could stay alive under these conditions for a considerably longer period than was necessary to explain this outbreak. Whether or not this was actually the mode of infection will never be determined, although it was amply demonstrated that the infection could have occurred in this way.

During the flood at the end of March much apprehension was created in many communities as to the possible menace of typhoid fever. This fear was aggravated by certain alarming broadcasts as well as by the action of some boards of health in either ordering or urging immunization against typhoid of all persons entering the flooded area. The Department strongly recommended against routine typhoid inoculation as it believed that this was entirely unnecessary and created a sense of false security. In spite of the advice of the Department certain communities immunized on a very extensive scale. Others followed the advice of the Department and did no immunization. That this immunization was unnecessary and the advice of the Department sound was shown by the fact that in neither group of communities was there any typhoid which could be traced to the flood. It was perhaps the irony of fate that Lowell, which did the largest job of immunizing, should be the community to have a widespread outbreak of typhoid later in the year. Perhaps the typhoid immunization in the spring modified or prevented a few infections, and perhaps it also made it possible for the milk handler in question, who had been immunized in the spring, to have a mild, unrecognized infection rather than a frank case which would have incapacitated him from delivering this milk. The experience of the flood shows that so long as the public water supplies of the State continue safe to use there is no need for typhoid immunization in Massachusetts merely because certain homes are flooded by river water. It may be assumed that river water in time of flood carries pollution in a less concentrated form than is the case during normal flows or drought conditions, and therefore at such times is less likely to transmit disease.

Investigation of the 141 cases of typhoid which occurred during the year brought to light 15 carriers. The typhoid carrier list increased from 108 to 115. Two of the carriers died during the year, 3 were taken off the list following gallbladder removal, and 3 moved out of the State.

Of the 141 cases of typhoid the source of infection was found in 63. Of these, 38 were due to food infected at a banquet, as noted above, 17 to contact with a carrier, and 8 to known direct contact with a recognized case of typhoid. Of the latter, one is of special significance inasmuch as she was a nurse caring for a known case of typhoid and had been advised by the attending physician that immunization was unnecessary.

Undulant Fever.—The past year showed a marked increase in the incidence of recognized cases of undulant fever, the number increasing from 15 in 1934 to 42 in 1935 and to 55 in 1936. There were 4 deaths from this disease. Of the cases, all

but 3 gave a history of habitual use of raw milk, although only 15 per cent of the milk in the State is sold raw. The cases were concentrated very largely in the Berkshires and in the area around Attleboro with the rest of the cases widely scattered throughout the State. Two definite outbreaks occurred. Several cases in and around Pittsfield give a history of taking raw milk from one farm on which it was known that there was a high infection rate of contagious abortion. The proprietor of this farm had tried in vain to control this disease through a program of slaughtering all known reactors. That this farm was selling special raw milk indicates how little protection is implied by the mere fact that the milk comes up to present standards for special milk. Three cases in and around North Adams were users of raw milk from a single dairy in Clarksburg. This herd had been infected with contagious abortion for fifteen or twenty years without known human cases. It is of interest that during the past year an attempt was made to control this infection in the herd through the use of living vaccines, which were injected not only into calves but into lactating animals. This may, of course, be coincidence or it may be that the infection of the persons using the milk was due to the vaccine used in treating the cows.

The public health problem presented by undulant fever is one which is assuming far greater proportions than in former years. It is today in Massachusetts the outstanding milk-borne disease for the prevention of which we have but one known method, namely, pasteurization. Attempts to control the disease in cattle through vaccination may possibly be effective from the point of view of agricultural economics, but it is yet to be shown that it is safe from the point of view of the human consumer. It has been amply demonstrated that vaccination of adult animals constitutes a hazard to the consumer and is a practice which, while actively supported by certain commercial interests, is one which should be discouraged unless the milk from such cows is pasteurized.

Whooping Cough.—After a year of very light incidence of whooping cough the disease increased rapidly during 1936, reaching the level only slightly below the average for the last five years. It is of interest, however, that in spite of this increase in the disease the number of deaths fell to the lowest figure ever recorded in the history of the Commonwealth. It seems probable, however, that the decline is due in large part to better medical and nursing care of these cases, and a reflection of better public appreciation of the danger of whooping cough in small children.

Gonorrhea and Syphilis.—There has been unusual interest shown in the control of gonorrhea and syphilis during the past year as a result of the passage of the Social Security Act by Congress and the emphasis placed upon the control of syphilis by the Surgeon General. The immediate effect of the Social Security program has been the extension of follow-up service in several of the clinics, the continuation of the experiment of the follow-up of private physicians' cases, the expansion of administrative personnel and the limited distribution of bismuth.

The number of reported cases of gonorrhea and syphilis is about the same as for the previous year. Twenty-six of the 30 clinics in the State make monthly reports to the Department of new admissions, visits, etc. These show a decline in the admission of new cases of syphilis and of gonorrhea, although the total admissions to the clinics of cases of syphilis have increased. There has been a reduction in the distribution of arsenicals which may be significant as further evidence of a declining incidence of syphilis in the Commonwealth. It is coincident with the first decline in years in the total number of visits to clinics and it follows a decline over the last 10 years of the number of new admissions to clinics.

Division of Biologic Laboratories.—The work of this Division continues to increase. In the Wassermann Laboratory this increase is in the number of specimens examined, but in the Antitoxin and Vaccine Laboratory the increase is in the diversity of products distributed rather than in volume of distribution.

The marked decrease in diphtheria is reflected in the smaller amount of diphtheria antitoxin distributed. There is less demand for diphtheria toxin-antitoxin mixture and diphtheria toxoid because there are few communities left where extensive immunization programs have not already been undertaken. These products have been displaced to some extent by diphtheria toxoid, alum precipitated, although this Department does not believe that this change is warranted. The continued use of toxin-antitoxin mixture, except in special instances, does not appear

to be desirable and should be discouraged. The distribution of this product by the Department will probably be discontinued in the near future.

There has been a slight decrease in the number of vials of antipneumococcic serum for Types I and II distributed this past year, but the number of units per vial has averaged somewhat more. Therapeutic serums for Types V, VII, and VIII are in preparation.

The floods in March caused a sudden and unprecedented demand for typhoid-paratyphoid vaccine which could not be entirely filled with the stock on hand, and additional supplies were obtained from the Army Medical School in Washington.

More antimeningococcic serum was distributed in 1936 than in any year since 1930.

The distribution of smallpox vaccine was the lowest since 1923, owing both to the absence of smallpox and to improved distribution arrangements.

The regulation requiring the use of silver nitrate instead of other prophylactics for the prevention of ophthalmia neonatorum is undoubtedly responsible for the increased demand for this product.

Wassermann Laboratory.—The number of specimens received and tests performed continue to increase. A total of 191,545 specimens have been examined. Approximately 160,000 of these were serologic tests for syphilis. Sixty-five hundred gonococcus fixation tests were made. For the Division of Livestock Disease Control, 23,286 agglutination tests for Brucella abortus and 342 examinations for rabies were made.

Bacteriological Laboratory.—The number of examinations made in the Diagnostic Bacteriological Laboratory almost equaled the record high figure for 1935. The actual figures as to examinations are, however, misleading as a measure of the work of the laboratory as during the past few years there has been a constant decline in those tests which are most easily performed, with a coincidental rapid increase in many of those which are most time consuming. The load of work upon the laboratory has therefore been greatly increased, making it necessary to employ an additional bacteriologist under the Social Security budget. The twenty-four hour pneumonia typing service which has been maintained for the last two years has also placed an additional load upon this laboratory. Changes in technique involving the use of additional media for typhoid cultures and for tuberculosis cultures, as well as the more recent addition of macroscopic slide agglutination tests for Widals, have added to the efficiency of the laboratory but have also constituted an added burden.

III. Hygiene

Division of Child Hygiene.—The activities of this Division were greatly augmented and several new activities were launched when Federal funds under the Social Security Act were made available. Medical service for the preschool child was increased through the appointment of a second unit for the examination of children within this age group. Dental service was increased through the appointment of a pediatrician who is also a dentist, and who is responsible for the dental program which will be much broadened in the coming year. Early in June, the premature program, a new activity of the Division, was organized and personnel selected to carry on this program, the objectives of which are the reduction of deaths of premature infants and the improvement of standards for premature care. To this end we are attempting to secure early and prompt reporting of premature births by physicians; the furnishing of hospital centers adequately equipped to care for prematures; the transportation of prematures to the center where proper care can be given; and the teaching of care of premature infants to nurses and to lay groups. Through Federal grants from the Children's Bureau and the United States Public Health Service a teaching center for the New England States was established at the Harvard School of Public Health. Postgraduate courses in obstetrics and pediatrics are also available through the Social Security program of the Division.

Maternity Service.—The regular program in this field was carried on as usual throughout the year. At the close of the calendar year there were on the registry for the monthly prenatal letters, and letter to fathers, approximately 1,228 names; for the first-year postnatal service, 14,027 names; and for the second-year postnatal service, a total of 13,680 names. This makes a total of 28,935 names of

prospective mothers and fathers and mothers of children under two years of age receiving instruction in prenatal care, maternity care, and care of the baby during the year 1936.

Mothers' Classes.—The usual assistance was given local communities by the Public Health Nursing Consultants in the formation of Mothers' Classes and in activities of importance for those already established.

Well Child Conferences.—One of the staff pediatricians attended Well Child Conferences in 16 towns at which medical examinations were made of the children attending. Many of the towns in which conferences were held had no resident physician, but in those where physicians were resident they were contacted by the Conference physicians of the Division. Growing out of the needs found through the Well Child Conferences, a health survey of the preschool child was begun in June. Similar conferences were held for the examination of children attending nursery schools conducted under the supervision of the State Department of Education.

Summer Round-Up.—Co-operating with local parent-teacher associations and with other local organizations and nurses, the usual service was afforded in the way of providing printed material and advice for the conduct of this activity locally.

School Hygiene.—Several interesting projects indicating progress in the field of school hygiene were carried on during the year. Special attention was given to the town of Millville, and this project will be reported in detail by the Division of Child Hygiene.

An Advisory Committee on School Hygiene has been formed, which is in line with the policy of the Department of forming advisory committees for various fields of endeavor. This committee is composed of two superintendents of schools, two dentists, two school nurses, a nutritionist, three State officials, and the Commissioner of Public Health who serves as chairman.

A study of physical record cards of eighth-grade children was begun during the year, the purpose of which was to learn how efficiently follow-up of health examinations is carried on as shown by correction of defects over a period of years; what defects tend to increase or decrease as the child progresses through the grades; in what type of community corrections of defects are best carried out; and certain other pertinent facts.

School hygiene surveys were made in Amherst and Webster, and recommendations sent to the local superintendents of schools.

"Contact," a pamphlet issued for school health workers, continues to be well received. This year every specialty having to do with school health work was allotted a column in each issue for special messages in that particular field.

The Department now has an audiometer, which has been used in many of the schools.

Public Health Nursing.—Many changes have been made in the general nursing program of the Division because of the expansion of the work permitted under the Social Security grants. A number of nurses were added to the staff and the nursing districts were made smaller in size, but the program for all consultant nurses was placed on a generalized nursing basis so as to include supervision and consultation for all types of nursing service.

School Nursing.—Valuable assistance was rendered by the Consultants in plans and programs of local communities for adequate school nursing service, in the establishment of dental clinics for school children; in the work with the audiometer testing of school children; in the matter of keeping adequate records and assisting newly appointed school nurses in their program; and in the conduct of school nursing surveys.

Communicable Disease Nursing.—Particular attention was focussed on the matter of immunization programs against diphtheria, in co-operation with the State District Health Officers and the local health authorities. The Consultant Nurses aided in the school lunch programs, the formation of health clubs, and in the programs for the care of premature infants.

Institutes.—This year the Institutes for Public Health Nurses, conducted in co-operation with the Commonwealth Fund, were devoted to the subject of communicable disease. Series of eight two-day institutes were held in eight different communities of the State.

Scholarships for Nurses.—Scholarships afforded by the Commonwealth Fund were made available to a number of nurses at East Harlem Nursing and Health Center in New York. Through Social Security funds additional scholarships were granted to nurses, to be given at Simmons College School of Public Health Nursing.

Nutrition.—The Nutrition Advisory Committee met in the fall for a discussion of nutrition problems, and gave helpful advice on how to get financial support, as well as interest, of counties and communities for the employment of a nutritionist.

School Lunch.—One of the nutritionists devoted most of her time during the year to the continuance of the School Lunch Survey and offered necessary assistance in the matters of food selection, buying, equipment, cost accounting, and organization of kitchen and food orders. Through this service, 57 communities were reached. Talks were given to local organizations interested in securing adequate school lunch service for the children.

A summer course in nutrition for school lunchroom managers was given at Fitchburg State Teachers' College. Forty school lunch managers attended. Similar courses were given also to the vocational school home economics teachers.

At the Well Child Conferences conducted by the Division of Child Hygiene a nutritionist was in attendance as a member of the Unit staff, and gave advice and assistance to parents. For the nursery schools, similar service was provided.

Nutrition service was provided to many communities through the Works Progress Administration or welfare agencies. Consultant service in nutrition was also furnished to 18 summer camps which requested it. Health practices in these camps were much improved by the instruction given.

The services of the nutritionists were much in demand in the areas which suffered from the disastrous floods in the spring.

Parent Education.—A Consultant in Parent Education was appointed under the Social Security program. A survey was made of the general needs which might be met in this field, and particular service was given at the Well Child Conferences in the matter of consultant service to the parents attending.

Posters were made, book lists prepared on child development and rearing, and other material is in process of preparation for distribution at the conferences for the guidance of parents.

The most important project in this field was the planning of a course of instruction for lay leaders in parent education, which will be started early in the year. These leaders, following the course, will be expected to carry on parent education in their own communities, and institutes will be planned for their future guidance and instruction.

Research Learning Project.—This special project was launched this year through a grant of Social Security funds to carry on a research learning program with special reference to learning handicaps because of vision difficulties. A complete plan was laid down for testing the eye and ear functions of young children. A survey of the needs was made in selected sections of the State and upon special request of the local school officials. Demonstration testing was begun in the town of East Longmeadow with most enlightening results, and further work is being carried on. Consultation service was given to teachers and nurses.

Health Education.—This field of activity in the Division of Child Hygiene has been expanded during the year through Social Security funds and included the appointment of a Teacher Training Coordinator in Health Education. Much time was spent in surveying the field to discover present needs in health education for elementary and high schools and in organization for the demonstration of health education programs. Suitable material was prepared for use in carrying on this program, group meetings were held, and lectures given on the subject in several communities.

Publicity.—Consultation service was rendered to a number of communities in connection with their preparation for Well Child Conferences, and news releases were prepared.

The Health Education Supervisor, in charge of the exhibits of the Department, had a very busy year. Much time was spent in planning and executing display material for four of the larger State Fairs. For exhibit and general use during the year, a number of new pieces of display material were executed.

Four new issues of the bulletin of the Department, "The Commonhealth," were printed during the year, including a reprint number of "Nutrition in the Community." The other issues were "Reprint Number," which included a reprinting of various articles for which there was great demand, "Dental Health," and "Parent Education."

Division of Adult Hygiene.—Improvement of the State-aided cancer clinics, of which there are now 19, organization of new clinics, coordination of the activities of the clinic social workers by monthly conferences of the entire group with the Director, extension of the Cooperative Cancer Control Committees together with the systematization of follow-up in these committees, and the quinquennial review of hospital cancer admissions, are the principal achievements of this Division. This year marks the conclusion of ten years of activity in the Massachusetts cancer program, and a review of the important trends which lead up to the program in its present status seems pertinent.

Cancer Clinics.—The first State-aided cancer clinic was opened in Newton on December 17, 1926, and others followed in rapid succession. While the original purpose of the clinics was to furnish group diagnosis, this was rarely possible in the early part of the program. Some of the clinics made use of consultants from Boston hospitals, but the tendency of the local men to leave all work to the consultant made this practice objectionable. This was a drawback and defeated one of the first principles of the program—the viewing of many cancer cases by the clinic staff. Uniform record systems were inaugurated in all clinics for social economic and medical data. Few of them did this. X-ray diagnosis was inadequate. Transportation of patients to hospitals was often difficult.

From the beginning, every means of evaluating the work as it progressed has been employed. In 1934, after eight years of experimentation, the steps necessary to make the cancer clinics real factors in the community were deduced and a complete reorganization was begun. The transition has taken nearly two years and has resulted in complete group diagnosis, adequate X-ray service, good medical social records, adequate transportation facilities, and a teaching service in the clinics that is becoming more effective and more popular with the profession and the public.

Cancer Therapy.—In the years preceding the Massachusetts cancer program the number of physicians who felt competent to treat the disease was much greater than at present. Nearly every surgeon believed cancer to be his province and many general practitioners who were doing minor surgery attempted the treatment of some types of cancer. Other general practitioners who had seen few cancer cures felt that little could be done and believed palliative therapy sufficient. At a later period, radium and X-ray therapy came into use. As the Massachusetts cancer program has advanced with its group diagnosis and its teaching clinics, some surgeons, radiologists, and pathologists are emerging who are becoming authorities on the diagnosis and treatment of the disease. They make a practice of exchanging ideas with one another so that their final opinion is of far greater value to the patient than was formerly the case.

Education.—Education of the lay public in regard to cancer has been an important part of the work of this Division. The Massachusetts cancer program followed the lead of more experienced educators and used the newspapers, which were augmented by radio, pamphlets, and addresses. This form of publicity had the effect of arousing interest in cancer, and many individuals, usually in the later stages of the disease, attended the clinics, as well as many others who had conditions that did not call for such examination. It was then decided to have patients attending the clinics referred by a physician as far as possible, although persons would not be refused an examination if they came of their own volition.

Cooperative Cancer Control Committees.—Such committees are being formed throughout the State and are becoming very effective units for the dissemination of knowledge concerning cancer. These committees are composed of persons who represent different groups in the community. The members of the committee arrange to have at least one meeting annually in the club or organization they represent to discuss the subject of cancer. Some groups prefer a formal talk followed by a question period, while others prefer a round-table discussion with the local physician whom they have asked to address them. The local physician

becomes a teacher in this program and is very effective because he knows his community and the individuals composing the group and can discuss the problem in an informal way. During the past year 69 committees of this sort have been organized, and from present indications the whole State will have been organized by the end of next year.

Pondville Hospital.—The work of the Pondville Hospital has been substantially increased by the addition of a twenty-five bed wing and a new service building, which were opened in December, 1935. Because of these additional facilities, the admissions rose to 1,474, an increase of 24 per cent for the year, and the number of operations totaled 1,372, an increase of 30 per cent. The Out-Patient Department showed further growth with a total of 4,991 visits for the year. The addition of an anaesthetist to the visiting staff has contributed materially to the surgical work of the hospital, and the opening of an adequate bacteriological laboratory has made it possible to carry out all necessary bacteriological examinations at the institution. The installation of a new oil-cooled X-ray therapy unit with shockproof tube stand has made it possible to keep up with the constantly increasing demands for deep X-ray therapy.

As a result of the continued growth of the hospital and the persistence of a long waiting list, Pondville is faced with the urgent need of a new administration and laboratory building. A dormitory for women employees is much needed, but a new administration building should be provided this year if possible.

Crippled Children.—The Social Security Act provided funds through the Children's Bureau of the United States Department of Labor to be used for service to crippled children. A Technical Advisory Committee was appointed, and a State plan drawn up and submitted to the Children's Bureau for approval. This was finally approved in the latter part of June, 1936, but funds were not actually received until the middle of July. In the meantime, active organization steps were taken. Dr. Edward G. Huber was appointed Assistant Director of the Division of Administration and put in charge of this program. A General Advisory Committee was formed to discuss detailed plans and procedures and fix a scale of fees for hospital care and clinic service.

Before starting the service to crippled children an effort was made to obtain full cooperation of the Massachusetts Medical Society. To this end a number of conferences were held with the officers of the Society and their approval of the plan obtained. A letter was sent by the President of the Society to the eighteen District Presidents advising them that the plan had been approved. The officers of the County Societies were also visited by members of the staff and the details explained to them. After many conferences, clinics were organized in eleven cities, namely, Pittsfield, Springfield, Greenfield, Worcester, Gardner, Lowell, Salem, Brockton, Fall River, Hyannis, and Haverhill. An orthopedic surgeon is in charge of each clinic. Patients are referred by local physicians. Only those who are financially unable to obtain adequate diagnosis and treatment are admitted to the clinics. Clinics are to be held monthly in each of the eleven cities. As children are found who require surgical care, arrangements are made for their treatment at a local hospital. The hospitals have agreed to take such cases at a fixed rate of $3.50 per day plus operating room fees and a minimum X-ray charge where that service is needed.

The Department of Public Welfare has been of great help in developing this work as they had in that Department the records of approximately 6,000 crippled children. All of those records have been copied in duplicate and sent to the field staff in their respective districts. New cards are added to this file as new cases are reported.

The field staff for service to crippled children consists of a Medical Supervisor, a Social Worker, two Orthopedic Nursing Supervisors, and three Physiotherapy Nursing Supervisors.

Legislation was passed permitting the admission of patients crippled from poliomyelitis to the Lakeville State Sanatorium as beds were available. Cases of this disease requiring surgical care will be admitted to that institution and to the State School for Crippled Children. Patients crippled from tuberculosis will continue to be admitted to the Lakeville State Sanatorium. New equipment for the treatment of poliomyelitis cases has been installed at the Lakeville State Sanatorium, consisting of a respirator, Hubbard tubs, and additional equipment for the

brace shop. Another bracemaker has been employed. All braces and apparatus required for the treatment of the cases found in the clinics will be made at this shop.

IV. Environmental Control

Division of Sanitary Engineering.—This Division has received 857 applications requiring the advice of the Department. Of this number, 229 related to municipal and other public water supplies, 266 to water supplies at dairies, semi-public supplies or supplies examined at the request of the local boards of health, 33 to water supplies at schools, 88 to water supplies at recreational camps, 5 to sources of ice supply, 35 to bathing and swimming pools, 37 to shellfish, 19 to pollution of streams, 75 to sewerage and sewage disposal, and 70 to miscellaneous matters including those relating to the Civilian Conservation Corps Camps, the Works Progress Administration, the Public Works Administration and other work relating to the activities of the Federal Government. This number is 23.5 per cent in excess of the number received during a similar period for 1935 and is the largest number ever received by this Division.

The rainfall for the twelve months ending December 31, 1936, as recorded by seven long-term well-distributed rainfall stations throughout the State which are under the supervision of this Division, was 51.97 inches, which is 7.40 inches in excess of the normal, but for the seven months May to November, inclusive, the deficiency was 0.31 inches.

There were deficiencies in rainfall in the months of February, April, May, June, July, October and November and a marked excess of rainfall during all of the other months. During the month of March there was an excess of 4.15 inches and in December 4.64 inches. The rainfall for the climatological year ending September 30, 1936, was 46.41 inches, which is 1.86 inches in excess of the normal.

Floods of March, 1936.—The abnormally high temperatures and excessive rainfall in March, with the frozen ground covered with a three months' accumulated snow having a large water content, resulted in the greatest runoff from the streams of this State and New England which has ever occurred so far as the records available show. These floods caused great damage throughout the State, especially in the Connecticut and Merrimack River valleys. The most serious conditions occurred during the week of March 15. The flows reached their peak on the 19th and 20th, but severe floods also were experienced during the previous week of March 8 which had their peak on the 13th and 14th.

Flood waters of questionable quality entered ten sources of water supply, but in all of these cases the sources flooded were shut off or the water supplied was adequately chlorinated and in some cases filtered. As an emergency measure, the Department advised that all consumers boil the water used for drinking and other domestic purposes until the condition of the source of supply could be ascertained. So far as is known to the Department, there was no sickness in the State traceable to pollution from these floods.

Water Consumption Records.—The water consumption records of the Metropolitan Water District, where approximately one and one-half million persons are supplied with water, showed an increase of about 2 per cent over that for the previous year. This increase is believed to have been due chiefly to the deficiency in rainfall during the months of June and July, which caused a short drought with increased demands for water for sprinkling lawns and similar purposes. There also was an increase in industrial demands. The only shortages of water supply reported were those in the city of Pittsfield when in the month of October approval of this Department was requested for the emergency taking of water from Onota Lake, and in Lawrence when that city was obliged to take water from neighboring municipalities during the period of the flood.

The elevation of water in Wachusett Reservoir was 5.72 feet below the spillway on December 31, which is 6.3 feet higher than the elevation in this reservoir on December 31, 1935.

Introduction of Public Water Supplies.—During the year public water supplies were introduced into eleven different communities. In addition, major improvements and extensions have been made in connection with public water supplies in six other cities and towns; treatment works were completed or underway in nine others; and chlorinators were installed in four communities.

Pollution of Streams.—As a result of the low flow in certain streams of the State during the past summer, the Department received complaints relative to the pollution of several rivers which called for investigation.

The work of the Division in an advisory capacity in connection with certain major stream pollution studies being conducted as Federal Works Progress Administration projects was continued. These studies, which concern the pollution of the Blackstone, the Nashua, the Housatonic, and the Hoosick rivers, were practically complete at the close of the fiscal year, and a report relative to them has been filed with the Legislature.

Sewage Disposal.—During the year 1936 additional sewage disposal works were commenced by the towns of Framingham and Nantucket, the city of Pittsfield, and the South Essex Sewerage District. There also have been a number of changes in connection with the disposal of sewage at the Veterans Bureau Hospital at Bedford, the Masonic Home in Charlton, Foxborough State Hospital, Gardner City Home, Westfield State Sanatorium, and the Wrentham State School.

Investigations at State Institutions.—The Engineering Division has been asked to advise other Departments of the Commonwealth as to water supplies and sewage disposal works for their institutions. In many instances studies have been made and plans drawn to provide for such service.

Federal Projects.—As in the year 1935, much of the time of the Division has been devoted to the examination of plans and field investigations relating to Federal Public Works Administration and Works Progress Administration projects.

Special Legislative Investigations.—As a result of the passage of certain resolves by the Legislature, the Sanitary Engineering Division has been called upon to participate in the largest number of special investigations ever undertaken in any one year. These investigations were as follows:

Chapter 4 of the Resolves of 1936.—Authorizing the Department of Public Health to make tentative rules and regulations to protect the purity of interstate waters used as sources of public drinking water supply.

Chapter 42 of the Resolves of 1935.—As revived and continued under the provisions of Chapter 5 and Chapter 36 of the Resolves of 1936 providing for an investigation relative to the discharge of sewage from the Metropolitan Sewerage District into Boston Harbor and its tributary waters and relative to certain related matters.

Chapter 6 of the Resolves of 1936.—Providing for an investigation relative to the advisability of restricting or otherwise modifying certain rights and powers of the Salem and Beverly Water Supply Board.

Chapter 18 of the Resolves of 1936.—Providing for an investigation by the Metropolitan District Commission, the Metropolitan District Water Supply Commission and the Department of Public Health relative to the setting off of a portion of Lake Cochituate in the town of Natick for boating and fishing.

Chapter 32 of the Resolves of 1936.—Providing for the continuance of Chapter 11 of the Resolves of 1935 enacted for the purpose of studying and investigating the public health laws and policies of the Commonwealth.

Chapter 42 of the Resolves of 1936.—Providing for an investigation by the Department of Public Health relative to the use of Wading River as a source of water supply for the city of Attleboro.

Chapter 48 of the Resolves of 1936.—Providing for an investigation by the Metropolitan District Water Supply Commission and the Department of Public Health relative to improving the distribution of water and more adequately preventing pollution of the sources of water supply of the Metropolitan Water District.

Chapter 49 of the Resolves of 1936.—Providing for investigation by the Department of Public Health in cooperation with the Federal Works Progress Administration relative to the sanitary condition of the Blackstone, Hoosick, Housatonic, and Nashua rivers within the limits of the Commonwealth.

Reports as called for in these investigations have been made to the Legislature as required. The report under Chapter 48 of the Resolves of 1936 will be filed with the Legislature the first Wednesday in December in the year 1937.

Civilian Conservation Corps and Other Camps.—The Engineering Division has continued its program of assisting the authorities of the Civilian Conservation Corps Camps by making bacterial examinations of the various sources of water supply in use at these camps and, where requested, by advising in matters of

sewerage and sewage and refuse disposal. In addition, similar assistance has been given at a number of recreational camps.

Shellfish.—During the past summer it was necessary for the Department to reject a shipment of shellfish from Canada which had entered this State without approval as required under General Laws and to forestall the entrance of a shipment of shellfish from Japan. The Division has assisted in securing seven prosecutions in court due to the sale of polluted shellfish, and it has been necessary for the Division to request revocation of twenty-seven certificates for the operation of shucking plants.

Rural Sanitation.—During the early part of the year this Division continued its investigations of water supplies and works for the disposal of sewage at rural schoolhouses under a Federal Works Progress Administration Community Sanitation Project. Because of the difficulties of obtaining local appropriations to construct the necessary sanitary works the project was cancelled in June, 1936. Prior to the cancellation of this project, water supplies and works for the disposal of sewage at some 350 schoolhouses had been examined and 100 Federal projects approved for construction.

Compacts.—During the past year this Division assisted in negotiations with other New England States with a view to forming compacts to regulate the development and the improvement of interstate waterways. In this connection several field examinations have been made and a number of meetings have been held. The results of these examinations and meetings indicate that an effort should be made to provide compacts leading to the construction of storage basins not only to prevent floods but also to equalize the flow in the Merrimack and Connecticut rivers so as to improve conditions resulting from pollution and to utilize these stored waters for generating power.

Cross Connections.—During the latter part of the year the Division has had the full-time services of an engineer under a Federal grant in the study of cross connections between public water supplies and fire and industrial supplies. Funds for this purpose have been made possible by the United States Public Health Service. Thus far the results of this investigation have shown that the advice of the Department to industries and others in 1927 and in subsequent years in this regard has been complied with only in a few cases. Accordingly, the Department requested the advice of the Attorney General relative to the authority of the Department to regulate such connections. He replied that he was of the opinion that the Department has authority to adopt rules and regulations relative to cross connections between public water supplies and fire and industrial water supplies.

Water and Sewage Laboratories.—In carrying out the work of the Water and Sewage Laboratories during the period from January 1 to December 31, 1936, 9,740 chemical analyses and 3,624 microscopical analyses were made in connection with the purification of water, sewage, industrial wastes and allied subjects. Each regular chemical analysis called for a number of determinations ranging from thirteen to twenty-five according to the source of the sample to be analyzed. Many analyses were necessitated by Chapter 5, Resolves of 1936, reviving and continuing the special commission established in 1935 to investigate relative to the discharge of sewage into Boston Harbor and its tributary waters.

Lawrence Experiment Station.—At the Lawrence Experiment Station 13,068 bacterial examinations and 2,484 chemical analyses, including 531 shellfish and 197 sand samples, were made. The operation of the shellfish purification plants was checked by the analyses of frequent samples. A large amount of work was done in testing a method of determining pollution in shellfish.

Much of the research work on sewage purification was discontinued on March 16th because the pipe through which the Lawrence sewage is pumped to the station was broken during the March flood. Much research work was carried on at this station in addition to the continuation of experimental work described in previous reports of the Division.

Food and Drugs.—With money received from the Social Security Act, an additional bacteriologist and inspector were appointed in connection with the examination of milk intended for pasteurization purposes. Up to the close of the year, practically all of this work pertained to milk shipped into the vicinity of Boston for pasteurization purposes. This has resulted in an increase in the number of samples examined bacteriologically.

The change in the narcotic law, requiring licensing of wholesalers, has not materially increased the work of the Division. There have been a few investigations in addition to that required for licensing. No violations have been detected.

In the latter part of 1935 a new inspector was appointed in connection with the new law relative to the bottling of carbonated beverages. There have been a number of cases brought before the courts either for operating in violation of the regulations or for operating without a license.

The Department has licensed a number of out-of-state establishments, in most instances accepting the inspection of the Department of the other State or of the city or town where the establishment was located. An investigation made near the close of the year of some of these plants showed that such reports of inspections were not always to be relied upon. Inspections of out-of-state ice cream plants showed in general a marked improvement over similar inspections made a year ago.

There has been an increase in violations of the mattress law, with a corresponding increase in the number of prosecutions, the principal violation being the use of second-hand material, claiming it to be new.

There have been several licenses issued to persons sterilizing second-hand material, and the character of work done by these establishments has been carefully checked and no violation has been detected.

The pasteurization establishments have been operating with fewer violations than were found in former years. The sanitary condition of these plants is perhaps the highest it has ever been in the State. We find occasionally that a few of these establishments are not heating milk to the required temperature for the required length of time. The chemical and bacteriological means of distinguishing between properly and improperly pasteurized milk are not at present sufficiently definite to warrant prosecution on those figures alone. Experiments are, however, being carried on with another method, which we believe may be of service in this respect.

The Department examined a large number of samples of so-called orangeade, including Vitamin C determination by a chemical method. These preparations are made of orange juice, lemon juice, sugar and water, to which color may or may not be added. The actual fruit juice calculated as orange juice, as determined by the mineral constituents, does not exceed on the average 7 per cent, whereas the apparent orange juice as determined from the citric acid and sugar content is approximately 30 per cent.

Throughout the country the feed control officials are now making Vitamin D determinations on feed for animals. They find that in general the Vitamin D_1 content of such material corresponds to the specifications under which the materia is sold. There is very little of this work done on food for humans. One State official reported that about 16 per cent of the Vitamin D milk sold in his State contained less Vitamin D than was specified.

It is inevitable that work of this character must be performed. At present the only satisfactory method for determining Vitamin D is the biological method, which requires considerable space and which would cost approximately $40 per sample.

Under the law pertaining to wood alcohol, inspectors visited various parts of the State, primarily to ascertain the names of those who needed State licenses. Through this work the State has licensed 143 persons engaged in the sale of wood alcohol on a State-wide basis.

Notwithstanding the numerous letters sent to local boards of health by the Department, such boards are in general ignoring this statute and are permitting persons to sell locally wood alcohol without the license required by law. We estimate that about 25 per cent of the persons selling wood alcohol locally are licensed and about 90 per cent selling it State-wide are licensed by this Department.

Several thousand samples of milk, ice cream and cream have been collected for bacteriological and chemical examination, details of which will be given in the report of the Director of the Division.

Minimum Wage Commission.—The recommendatory minimum wage law in Massachusetts was passed in June, 1912. Since that time various amendments have been enacted to improve the operation of the law. Under this law, up to January, 1933, decrees were established covering twenty-two occupations.

In June, 1934, the General Court passed the first mandatory minimum wage law (Chapter 308 of the Acts of 1934). Under this chapter many changes in the operation and administration of the minimum wage law were effected.

After the decision of the United States Supreme Court regarding the validity of the New York minimum wage law the Governor deemed it necessary for the General Court to pass an emergency measure (Chapter 430) on June 25, 1936, to supersede Chapter 308. The text of the new law is practically the same as Chapter 308, except that it has been made a health rather than a labor measure, and it removed the Division of Minimum Wage from the Department of Labor and Industries and placed it under the supervision of the Department of Public Health. The Minimum Wage Commission now consists of the Commissioner of Labor, Mr. James T. Moriarty, as Chairman, the Commissioner of Public Welfare, Mr. Walter V. McCarthy, and the Commissioner of Public Health, Henry D. Chadwick, M.D., with Miss Mary E. Meehan, Assistant Commissioner of Labor, as Executive Secretary.

In order to bring the provisions of the existing recommendatory decrees under the mandatory law new wage boards had to be established. In forming wage boards the Commission sends out letters to employers and employees in the industries which are to be included under the minimum wage decrees inviting them to nominate candidates to serve on the wage boards. The Commission selects its members from these nominations. The wage boards consist of seven members: three representing the employers, three representing employees, and a chairman to represent the public. Their duties are as follows: (1) To establish a fair minimum wage rate for women and minors of ordinary ability in an occupation; (2) to establish a suitable scale of rates for learners and apprentices; and (3) to submit recommendations to the Minimum Wage Commission for approval or disapproval.

Following a public hearing, if the Minimum Wage Commission approves the recommendations of the board, they, in turn, establish what is called a minimum fair wage rate or directory order. Failure to comply with the directory order subjects an employer to be summonsed before the Commission to show causes why his name should not be published for non-observance thereof, and if found non-observing the Commission may proceed with publication. After a directory minimum wage order has been in effect nine months the Commission, if of the opinion that a persistent non-observance of such order by one or more employers is a threat to the maintenance of any occupation, may after due notice and a public hearing make a directory order, or any part thereof, mandatory. Thereafter any employer in this occupation paying less than these minimum rates subjects himself to prosecution, the penalty being a fine, imprisonment, or both. The old law is recommendatory and the only punishment for non-compliance is advertising the firms who fail to comply with the law.

Penalties under the New Law.—Chapter 430, Acts of 1936. Section 22. (1) Any employer and his agent, or the officer or agent of any corporation, who discharges or in any other manner discriminates against any employee because such employee has served or is about to serve on a wage board or has testified or is about to testify before any wage board or in any other investigation or proceeding under or related to this chapter or because such employer believes that said employee may serve on any wage board or may testify before any wage board or in any investigation or proceeding under this chapter shall be punished by a fine of not less than fifty nor more than two hundred dollars.

(2) Any employer or the officer or agent of any corporation who pays or agrees to pay to any woman or minor employee less than the rates applicable to such woman or minor under a mandatory minimum fair wage order shall be punished by a fine of not less than fifty nor more than two hundred dollars or by imprisonment for not less than ten nor more than ninety days or by both such fine and imprisonment, and each week in any day of which such employee is paid less than the rate applicable to him under a mandatory minimum fair wage order and each employee so paid less shall constitute a separate offence.

(3) Any employer or the officer or agent of any corporation who fails to keep the records required under this chapter or to furnish such records to the commissioner or any of his authorized representatives upon request shall be punished by a fine

of not less than twenty-five nor more than one hundred dollars, and each day of such failure to keep the records requested under this chapter or to furnish same to the commissioner or any of his authorized representatives shall constitute a separate offence.

Status of Directory Orders.—Under the new law, wage boards have made reports on the following four classes of trades, and the Commission has approved these reports and issued directory orders: Laundry and Dry Cleaning, effective October 1, 1935; Electrical Equipment and Supplies, effective May 1, 1936; Retail Stores, effective October 1, 1936; and Boot and Shoe, Cut Stock and Findings, effective February 1, 1937.

Other boards are at work or will be appointed for the following occupations: Men's Clothing and Raincoat, Men's Furnishings, Candy, Brush, Muslin Underwear, Women's Clothing, Corset, Toys, Games and Sporting Goods, Stationery Goods and Envelopes, Bread and Bakery Products, Canning and Preserving and Minor Lines of Confectionery, Druggists' Compounds and Proprietary Medicines, Jewelry and Related Lines, Knit Goods, Millinery, Paper Box, Pocketbook and Leather Goods, and Office Cleaners.

V. Personnel

The organization of the Public Health Council has not changed during the past year, the Governor having reappointed Dr. Richard M. Smith and Dr. Francis H. Lally at the expiration of their terms.

Dr. Harold E. Miner, District Health Officer of the Connecticut Valley District for many years, died on September 16, and on October 14 Dr. John J. Poutas who for the past two years has been Assistant Director of the Division of Communicable Diseases was transferred to the position made vacant by the death of Dr. Miner.

On January 31 Mrs. Alice M. Nelson, who has served as Secretary to the Commissioner and the Public Health Council since 1926, resigned and Miss Florence L. Wall was promoted to this position.

On July 1 Dr. Gerald G. Garcelon was appointed Epidemiologist in the Division of Tuberculosis, succeeding Dr. Edward G. Huber who was promoted to the position of Assistant Director of the Division of Administration. On November 30 Dr. Joseph W. Reddy, who has served as Child Welfare Physician on the Chadwick Clinics since 1927, resigned because of ill health, and Dr. Philip E. Sartwell assumed the duties of this position.

The position of Public Health Dental Hygiene Supervisor in the Division of Child Hygiene was abolished and the position of Public Health Dental Hygienist established. This position was filled on August 1 by the appointment of Miss Evelyn B. Morse.

With the aid of the Social Security funds made available to the Department from the United States Public Health Service and the Children's Bureau of the Department of Labor it has been possible to add several new members to the staff of the Department. One of the new positions thus made possible was that of Assistant Director of the Division of Administration, to which position Dr. Edward G. Huber, formerly Epidemiologist in the Division of Tuberculosis, was promoted on July 1, and on July 21 Dr. Paul Wakefield was appointed Supervisor of Clinics for Crippled Children. To assist in the new program for services to crippled children, Miss Marjorie Foster, Miss Ruth E. Sweet, and Miss Martha L. Willard have been appointed Public Health Nursing Supervisors in Physiotherapy, and Miss Estelle H. Kezer and Miss Elizabeth R. Savage have joined the staff as Public Health Nursing Supervisors (Orthopedic). It has also been possible to create the position of Public Health Social Work Supervisor, to which position Miss Christine Moir was appointed.

The following new personnel, made possible by Social Security Funds, are assisting in the expanded program for Maternal and Child Health: Dr. Florence L. McKay, who was appointed Assistant Director of the Division of Child Hygiene on May 13; Dr. Florence B. Hopkins and Dr. Sallie Saunders, who were appointed Child Welfare Physicians on April 1; Dr. Lura Oak, appointed to the position of Head of Research Learning Project on September 1; Miss Jean Latimer and Mrs. T. Grafton Abbott, who are employed as Teacher Training Coordinators;

Miss Ann Ward Dinegan, appointed as Supervising Instructor in Public Health Nursing on April 1; Miss Marjorie L. Adams, Miss Marguerite C. Libby, Miss Mary C. Lewis, Mrs. Elizabeth Brown Franke, Miss Martha E. Hanson, Miss Christine B. Higgins, and Miss Marion S. Perkins, employed as Public Health Nursing Supervisors; Mrs. Madelen Perry Pollock, as Infant Welfare Field Nurse; Miss Genevieve M. Ely, Dental Hygienist; Miss Miriam Forster, Research Assistant, and Miss Dorothy Frank, Miss Helen Hinman, and Miss Irene M. Cronin who are employed as Nutrition Workers.

On September 3 Dr. Paul E. Johnson was appointed Epidemiologist in the Division of Communicable Diseases, and on November 1 Dr. Thomas J. Cavanaugh was appointed Epidemiologist in the Subdivision of Genitoinfectious Diseases. Mrs. Margaret Davis Walter joined the staff of this Subdivision as Public Health Nursing Supervisor on June 17.

It has also been possible to appoint several additional engineers, chemists, bacteriologists and clerks so that at the end of the year the number of personnel employed under Social Security was 59.

VI. Organization

The organization of the Department is as follows:

Commissioner of Public Health 1
Public Health Council 6
Division of Administration:
Secretary (1), Epidemiological Consultant (1), Clerks and Stenographers (13)
(Social Security): Assistant Director of Public Health Administration (1), Health District Sanitary Officer (1), Supervisor of Clinics for Crippled Children (1), Public Health Nursing Supervisors (5), Public Health Social Work Supervisor (1), Laboratory Technician (1), Dental Hygienist (1), Clerk and Stenographer (1) . . . 27
Division of Adult Hygiene:
Herbert L. Lombard, M.D., Director.
Epidemiologists (3), Social Workers (3), Public Health Education Workers (2), Clerks and Stenographers (15)
(Social Security): Clerks and Stenographers (2) 26
Division of Biologic Laboratories:
Elliott S. Robinson, M.D., Director.
Assistant Director (1), Chemists and Bacteriologists (11), Laboratory Assistants (3), Laboratory Helpers (8), Stable Foreman (1), Laborers (15), Janitors (2), Clerks and Stenographers (5)
(Wassermann Laboratory):
Chief of Laboratory (1), Bacteriologist (1), Laboratory Technician (1), Laboratory Assistant (1), Laboratory Helpers (6), Clerks and Stenographers (3)
(Social Security): Bacteriologist (1), Laboratory Helper (1), Clerk and Stenographer (1) 63
Division of Child Hygiene:
M. Luise Diez, M.D., Director.
Child Welfare Physician (1), Epidemiologist (1), Public Health Dental Hygienist (1), Public Health Nutrition Workers (4), Public Health Education Workers (2), Clerks and Stenographers (9)
(Maternal and Child Hygiene):
Child Welfare Physician (1), Public Health Nursing Supervisors (6), Clerks and Stenographers (4)
(Social Security): Assistant Director (1), Child Welfare Physicians (2), Public Health Dental Hygienist (1), Public Health Nutrition Workers (4), Public Health Nursing Supervisors (8), Teacher Training Coordinators (2), Head of Research Learning Project (1), Research Assistant (1), Infant Welfare Field Nurse (1), Clerks and Stenographers (7) 58

Division of Communicable Diseases:
Gaylord W. Anderson, M.D., Director and Deputy Commissioner.
District Health Officers (7), Epidemiologists (3), Clerks and Stenographers (8)
(Social Security): Epidemiologist (1), Bacteriologist (1), Clerk and Stenographer (1)
(Diagnostic Laboratory):
Bacteriologists (5), Laboratory Assistant (1), Laboratory Helper (1), Laborer (1), Clerks (2)
(Genitoinfectious Diseases):
Assistant Director (1), Epidemiologist (1), Public Health Education Worker (1), Clerks and Stenographers (3)
(Social Security): Epidemiologist (1), Public Health Nursing Supervisor (1), Clerk and Stenographer (1) 41

Division of Food and Drugs:
Hermann C. Lythgoe, Director.
Chief of Laboratory (1), Chemists and Bacteriologist (5), Inspectors (14), Laboratory Helpers (2), Laborer (1), Clerks and Stenographers (7)
(Social Security): Bacteriologist (1), Food Inspector (1) . . . 33

Division of Sanitary Engineering:
Arthur D. Weston, Director and Chief Sanitary Engineer.
Engineers and Engineering Assistants (15), Clerks and Stenographers (12)
(Social Security): Engineering Assistants (4), Clerk and Stenographer (1)
(Water and Sewage Laboratories):
Laboratory Coordinator (1), Chiefs of Laboratory (2), Chemists and Bacteriologists (10), Laboratory Assistant (1), Mechanical Handyman (1), Laborer (1), Watchman (1), Clerks and Stenographers (4)
(Social Security): Chemist (1) 55

Division of Tuberculosis:
Alton S. Pope, M.D., Director.
Assistant Director (1), Epidemiologist (1), Superintendent of Sanatoria Construction (1), Inspector of Settlements and Support Claims (1), Social Workers (2), Field Nurse (1), Clerks and Stenographers (8)
(Social Security): Clerk (1)
(Tuberculosis Clinics):
Supervisor of Tuberculosis Clinics (1), Child Welfare Physicians (2), Field Nurses (3), Public Health Nutrition Workers (2), X-ray Clinic Field Agents (2), Clerks and Stenographers (8) 35

Minimum Wage Commission:
Mary E. Meehan, Executive Secretary.
Inspectors (4), Clerks and Stenographers (5) 10

Total 355

VII. Publications

The following articles by members of the staff have been published:

Division of Administration

The Massachusetts Cancer Program—
Henry D. Chadwick, M.D., and Herbert L. Lombard, M.D.
New England Journal of Medicine, 215: 265–267, August 13, 1936.

Division of Adult Hygiene

Diabetes Epidemiology from Death Records—
Elliott P. Joslin, M.D., and Herbert L. Lombard, M.D.
New England Journal of Medicine, 214: 7–9, January 2, 1936.

Fundamentals of Epidemiology—
Eleanor J. Macdonald, A.B.
Radcliffe Quarterly, February, 1936.

Division of Biologic Laboratories

Monkey Test for Chill-Producing Activity of Concentrated Antipneumococcic Serum—
L. A. Barnes and Elliott S. Robinson, M.D.
American Journal of Public Health, 26: 51–53, January, 1936.

Comparisons of Various Methods for the Routine Titration of Types I and II Antipneumococcic Horse Serums—
L. A. Barnes, Charlotte M. Clarke and Eleanor C. Wight.
Journal of Immunology, 30: 127–138, February, 1936.

The Spontaneous Transformation of Pneumococcus Type V to Type II—
L. A. Barnes and Eleanor C. Wight.
Journal of Bacteriology, 32: 557, November, 1936.

Studies in Diphtheria Toxin Production. I. The Effect of Iron and Copper—
Alwin M. Pappenheimer, Jr., and Sylvia J. Johnson.
British Journal of Experimental Pathology, 17: 335.

Studies in Diphtheria Toxin Production. II. Production of Potent Diphtheria Toxin on a Simple Amino-Acid Medium—
Alwin M. Pappenheimer, Jr.
British Journal of Experimental Pathology, 17: 342.

The Standardization of Typhoid and Paratyphoid Vaccines. The Value of the Gates Apparatus and Total Nitrogen Determinations.
Roy F. Feemster, M.D., Leslie H. Wetterlow, and Joseph Cianciarulo.
American Journal of Public Health, 26: 1176, December, 1936.

Division of Communicable Diseases

The Decreasing Prevalence of Syphilis in Massachusetts—
Nels A. Nelson, M.D.
Journal of the American Medical Association, 106: 105–109, January 11, 1936.

That Word "Venereal"! (Editorial)—
Nels A. Nelson, M.D.
American Journal of Syphilis, Gonorrhea and Venereal Diseases, 20: 88–91, January, 1936.

That Connecticut "Blood Test Before Marriage" Law—
Nels A. Nelson, M.D.
Bulletin of Massachusetts Society for Social Hygiene, 6, No. 2, February, 1936.

Typhoid Carriers: A Study of Their Disease Producing Potentialities over a Series of Years as Indicated by a Study of Cases—
G. W. Anderson, M.D., A. D. Hamblen and H. M. Smith.
American Journal of Public Health, 26: 396–405, April, 1936.

Genitoinfectious Diseases. (Editorial)—
Nels A. Nelson, M.D.
American Journal of Syphilis, Gonorrhea and Venereal Diseases, 20: 448–450, July, 1936.

The Civilian Educational Program in the Control of Syphilis—
Nels A. Nelson, M.D.
Journal of the American Medical Association, 107: 872–874, September 12, 1936.

Gonorrhea—
Nels A. Nelson, M.D.
Milbank Memorial Fund Quarterly, 14, October, 1936.

Division of Child Hygiene

Lunch in the Country School—
Mary Spalding.
The Nation's Schools, 17: 55, June, 1936.

The School Lunch—
Mary Spalding.
The Massachusetts Selectman, 1: 17, October, 1936.

Division of Tuberculosis

Bronchoscopy and the Differential Diagnosis between Tuberculosis, Lung Abscess and Bronchiectasis—
G. Arnold Rice, M.D.
New England Journal of Medicine, 213: 1173–1174, December 12, 1935.

Dangers Inherent in the Clinical Diagnosis of Cancer—
Dudley Merrill, M.D.
Yale Journal of Biology and Medicine, 8: 253–264, January, 1936.

Some Considerations on the Results of Intrapleural Pneumolysis—
Paul Dufault, M.D., and Armand Laroche, M.D.
American Review of Tuberculosis, 33: 219–227, February, 1936.

Carcinoma of the Prostate Simulating Primary Rectal Malignancy—
C. J. E. Kickham, M.D.
Journal of Urology, 35: 342–348, March, 1936.

One Hundred Untreated Cancers of the Rectum—
Ernest M. Daland, M.D., Claude E. Welch, M.D., and Ira T. Nathanson, M.D.
New England Journal of Medicine, 214: 451–458, March 5, 1936.

The Radiological Management of Cancer of the Breast—
Richard Dresser, M.D., and Valmore A. Pelletier, M.D.
New England Journal of Medicine, 214: 720–723, April 9, 1936.

Pathological Fractures Due to Malignant Disease—
Claude E. Welch, M.D.
Surgery, Gynecology and Obstetrics, 62: 735–744, April, 1936.

Congenital Defect of the Pectoral Muscles—
Rufus R. Little, M.D.
New England Journal of Medicine, 214: 934–936, May 7, 1936.

A Precaution in Stab-Wound Colostomy—
Grantley W. Taylor, M.D.
Surgery, Gynecology and Obstetrics, 63: 230, August, 1936.

Osseous Metastases of Carcinoma of the Prostate with Special Reference to the Perineural Lymphatics—
Shields Warren, M.D., Paul Harris, M.D., and Roger Graves, M.D.
Archives of Pathology, 22: 139–160, August, 1936.

The Future Possibilities of Tuberculin Testing Program in Massachusetts Schools—
Carl C. MacCorison, M.D.
Massachusetts Health Journal, September, 1936.

Life Expectancy and Incidence of Malignant Disease. 1. Carcinoma of the Breast—
Ira T. Nathanson, M.D., and Claude E. Welch, M.D.
American Journal of Cancer, 28, September, 1936.

Manometric Readings of Intrapleural Pressures in Artificial Pneumothorax—
Andrew Peters, M.D., Alton S. Pope, M.D., and J. Cramer Hudson, Ph.D.
American Review of Tuberculosis, 34: November, 1936.

Artificial Pneumothorax in Adolescents—
Rufus R. Little, M.D.
New England Journal of Medicine, 215: 960–962, November 19, 1936.

Division of Food and Drugs

The Enforcement of the Law relating to Bedding and Upholstered Furniture—
Hermann C. Lythgoe.
New England Furniture News, Boston, March, 1936.

Comparison of Methods for the Detection of Gelatin in Dairy Products—
Carl S. Ferguson and Phileas A. Racicot.
Journal of the Association of Official Agricultural Chemists, August, 1936.

Antifreeze—
Hermann C. Lythgoe.
Boston Transcript, November 14, 1936.

Division of Sanitary Engineering

Sanitation District vs. Local Plants—
Arthur D. Weston.
Municipal Sanitation, 7, No. 1, January, 1936.
Public Health Aspects of the Flood of March, 1936—
Arthur D. Weston.
New England Water Works Association Journal, 50, No. 4, December, 1936.

Department of Public Health

Appropriations and Expenditures for Year ended November 30, 1936

	Appropriations and Amounts Brought Forward	Expenditures to November 30, 1936
Division of Administration	$37,389.14	$35,260.64
Division of Adult Hygiene	97,690.00	95,014.03
Division of Child Hygiene	54,267.18	52,174.38
Maternal and Child Hygiene	38,081.34	35,238.16
Division of Communicable Diseases	92,466.64	90,364.19
Minimum Wage	20,643.84	19,152.11
Venereal Diseases	41,830.00	41,549.76
Division of Food and Drugs	73,749.25	73,225.63
Administration Shellfish Law	2,970.00	2,969.60
Division of Biologic Laboratories:		
Antitoxin and Vaccine	114,561.43	112,857.36
Wassermann Laboratory	23,910.00	23,517.88
Division of Water Supply and Sewage Disposal	152,867.24	151,604.50
Laboratory and other Expenses of Sundry Investigations	13.58	13.58
Wading River	250.00	223.43
Sanitary Condition Certain Rivers	8,000.00	1,943.83
Division of Tuberculosis	42,779.75	41,761.74
Subsidies to Cities and Towns	462,000.00	461,739.44
Tuberculosis Clinic Units	48,335.00	46,619.90
	$1,311,804.39	$1,285,230.16

Receipts for Year ended November 30, 1936

Licenses, etc.	$7,545.04

State Sanatoria and Pondville Hospital

Appropriations and Expenditures for the Year ended November 30, 1936

	Appropriations and Balances	Expenditures
Lakeville State Sanatorium	$337,883.51	$327,995.68
North Reading State Sanatorium	278,980.79	258,916.76
Rutland State Sanatorium	369,978.07	352,635.25
Westfield State Sanatorium	290,350.92	270,233.80
Pondville Hospital	355,175.84	332,423.80

Special Appropriations

Lakeville:		
Chapter 162, 1934, Item 533		
"Lamp Treatment Rm. and Equipment, Men's Ward"	$6,700.00	$6,692.33
Chapter 162, 1934, Item 534		
"Lamp Treatment Rm. and Equipment, Women's Ward"	6,700.00	6,698.70
Chapter 162, 1934, Item 535		
"X-ray Machine and Fluoroscope"	4,000.00	3,957.00
Chapter 249, 1935, Item 597		
Chapter 304, 1936, Item 593		
"Fire Protection and Sprinklers"	4,100.00	2,125.74
Chapter 304, 1936, Item 594		
"Improvements to Water Supply System"	2,200.00	707.38
Chapter 304, 1931, Item 595		
"Addition to Occupational Therapy Shop, and Equipment"	4,900.00	4,343.52
P.W.A. Docket 1354, Mass. State H-1—1934		
"Sewerage and Filters"	5,000.00	4,152.33
North Reading:		
Chapter 249, 1935, Item 599		
"Improving Water Supply"	1,500.00	1,477.00
Chapter 249, 1935, Item 600		
Chapter 304, 1936, Item 597		
"Fire Protection and Sprinklers"	4,500.00	2,296.55
Chapter 497, 1935, Item 600a		
"Purchase of Land"	35.00	35.00
Chapter 304, 1936, Item 598		
"Addition to Storehouse"	10,500.00	5,680.79
Chapter 304, 1936, Item 599		
"Employees' Dining Room"	2,000.00	None
Rutland:		
Chapter 162, 1934, Item 539		
"Fire Protection and Sprinklers"	3,600.00	3,563.55
Chapter 249, 1935, Item 602		
"Reconstruction of Roads"	12,006.94	12,006.94
Chapter 304, 1936, Item 601		
"Installation of Hydrants"	450.00	None
P.W.A. Docket 2275, Mass. State H-3		
"New Boilers"	37,000.00	34,257.60
Westfield:		
Chapter 304, 1936, Item 603		
"Improvements to Water Supply System"	6,500.00	4,942.28
Chapter 304, 1936, Item 604		
"Fire Protection and Sprinklers"	3,394.00	1,391.47
Chapter 304, 1936, Item 605		
"Enlargement of Sewage Disposal System"	7,400.00	2,365.09
P.W.A. Docket 1155-R, Mass. State H-102		
"Cancer and Tuberculosis Group"	950,000.00	500,561.51
Pondville:		
Chapter 249, 1935, Item 608		
"Installation of Incinerator"	2,000.00	1,892.54
Chapter 249, 1935, Item 609		
"Moving and Improving Bacteriological Laboratory"	2,000.00	1,990.94
Chapter 249, 1935, Item 610		
"Engine and Generator Reconditioning"	2,500.00	2,448.70
Chapter 304, 1936, Item 606a		
"Service Building Renovations"	12,500.00	11,670.53
Chapter 249, 1935, Item 612		
"Water Supply and Sprinklers"	3,000.00	2,883.82
Chapter 497, 1935, Item 612a		
"Generation of Power Improvements"	18,500.00	18,451.61
Chapter 304, 1936, Item 607		
"Improvements to Water Supply System"	500.00	262.88
Chapter 304, 1936, Item 608		
"Improvements—Sewage Disposal"	1,000.00	935.42
P.W.A. Docket 4200, Mass. State H-6		
"Hospital Addition"	95,425.00	93,351.97
P.W.A. Docket 4476, Mass. State H-5		
"Hospital and Service Building"	221,400.00	212,437.46

Receipts

Lakeville State Sanatorium	$119,504.92
North Reading State Sanatorium	66,738.75
Rutland State Sanatorium	154,533.80
Westfield State Sanatorium	61,013.66
Pondville Hospital	86,847.55

Respectfully submitted,

HENRY D. CHADWICK,

Commissioner of Public Health.

REPORT OF THE DIVISION OF ADULT HYGIENE

HERBERT L. LOMBARD, M.D., *Director*

A significant reduction in the period of delay between the first recognizable symptoms of cancer and consultation with a physician occurred in 1936. For the preceding nine years of the Massachusetts Cancer Program, this interval of delay has been carefully watched as it is the most tangible evidence of public response to educational activities in cancer. The delay has approximated slightly over six months, from the longest period of 6.6 months to the shortest period of 6.0 months from 1927 to 1936. In 1936 this figure was reduced to 5.0 months, an encouraging and definite improvement. The delay before appearing at a State-aided cancer clinic persisted greater than twelve months for the first four years and since then has been progressively decreasing to its new low in 1936 of 8.6 months.

The number of individuals having cancer who attended the State-aided cancer clinics has shown a steady increase from 302 in the first year to 1,229 in the last. The total number of cancer deaths rose steadily until last year when a decided drop occurred. It was hoped that this would be maintained, but the rate for 1936 is approximately the same as that for 1934.

TABLE I.—*The Massachusetts State-Aided Cancer Clinics*

	1927	*1928*	*1929*	*1930*	*1931*	*1932*	*1933*	*1934*	*1935*	*1936*
Number of clinics	6	12	12	13	12	12	12	12	17	19
Total individuals attending clinics	1,345	2,528	2,110	2,518	3,115	3,503	3,924	4,252	3,654	3,900
Total individuals having cancer	302	537	539	654	735	880	1,011	1,036	1,036	1,229
Total individuals having cancer of breast, cervix, skin, or buccal cavity	239	426	424	480	556	622	745	814	751	895
Total individuals having precancerous lesions	101	328	268	234	270	343	463	556	314	359
Percentage of individuals with cancer	22.5	21.2	25.5	26.0	23.6	25.1	25.8	24.4	28.4	31.5
Percentage of individuals with precancerous lesions	7.5	13.0	12.7	9.3	8.7	9.8	11.8	13.1	8.6	9.2
Number of teaching clinics	0	1	1	3	5	2	2	6	17	42
Median delay in months between first symptoms and first consultation with physician	6.0	6.0	6.3	6.6	6.5	6.1	6.1	6.2	6.1	5.0
Median delay in months between first symptoms and first visit to clinic	12.8	12.5	12.8	12.2	11.5	9.4	9.2	9.0	9.1	8.6
Median age of cancer patients	60.5	61.1	62.3	61.5	60.9	60.6	61.0	62.4	62.9	63.2
Cancer deaths in Massachusetts	5,454	5,611	5,672	5,813	5,859	6,153	6,382	6,675	6,483	6,777
Cancer death rate per 100,000 population	132.0	134.6	134.7	136.8	137.3	143.4	148.1	154.1	149.0	155.0

The increase in the number of cancer deaths is not as alarming as it appears at first glance. The population in Massachusetts continues to grow older with a resulting increase in deaths from causes peculiar to the older degenerative processes. The birth rate also has fallen appreciably within the past decade and as crude cancer death rates are based on the total population, a smaller number of individuals in the under-twenty age groups, who rarely have cancer, would increase the size of the death rate. This fact is well demonstrated when the death rates for the population between twenty and sixty are considered. In this age group there has been only a negligible increase in cancer among females since 1920. The disease is not increasing among females since what slight increase occurs in this sex is in late life. Among males the situation is different and a consistent rise, gradually becoming less but still increasing, is apparent. It is our opinion that at the present time we are about at the peak of cancer incidence and we doubt if a much greater rise occurs in the future aside from the effects of the changing age composition of the people. This can be no certainty until the male trend shows more definite signs of paralleling the female trend of the early twenties. That it is beginning to do so is evidenced by an increase of 48 per cent between 1910 and 1920 compared with a 15 per cent increase between 1920 and 1930 and only a slight increase between 1930 and 1935.

TABLE II.—*Cancer Death Rate in Massachusetts Age Group 20–60*

Rate per 100,000 Population

YEAR	Males	Females
1910	44.4	99.5
1911	48.5	101.9
1912	50.7	107.5
1913	57.1	109.2
1914	53.2	110.2
1915	60.3	107.2
1916	62.7	117.1
1917	56.3	116.7
1918	65.0	110.6
1919	62.7	111.1
1920	65.8	119.9
1921	70.0	117.3
1922	65.8	117.2
1923	65.8	115.7
1924	70.0	118.9
1925	66.5	119.3
1926	71.7	116.8
1927	72.5	118.8
1928	75.2	118.4
1929	72.3	115.7
1930	75.8	116.4
1931	68.3	119.1
1932	75.5	120.6
1933	77.7	115.2
1934	82.7	120.9
1935	77.8	111.0

TRENDS IN THE MASSACHUSETTS CANCER PROGRAM

This year a review of the important trends which lead up to the program in its present status seems pertinent.

Cancer Clinics

The first State-aided cancer clinic was opened in Newton on December 17, 1926. This was followed by the Worcester clinic which opened on February 9, 1927; Springfield on March 4, 1927; Lynn on April 22, 1927; Lowell on May 27, 1927; Pondville on June 21, 1927; Worcester North which included Fitchburg, Gardner, and Leominster on February 4, 1928; New Bedford on March 14, 1928; Lawrence on April 24, 1928; Franklin County which included Greenfield and Montague on April 27, 1928; Berkshire County which included Pittsfield, North Adams, and Great Barrington on May 31, 1928; Boston at the Boston Dispensary on July 6, 1928; and Brockton on June 12, 1930.

While the original purpose of the clinics was to furnish group diagnosis, this was rarely possible in the early part of the program. Some of the clinics made use of consultants from Boston hospitals, but the tendency of the local men to leave all work to the consultant made this practice objectionable. In some communities the clinics were held in several hospitals because local administrative difficulties made combination in one hospital impossible. This was a drawback and defeated one of the first principles of the program — the viewing of many cancer cases by the clinic staff.

Uniform record systems were inaugurated in all clinics for social economic data, and clinics were asked to prepare medical data. Few of them did this. X-ray diagnosis was inadequate. Transportation of patients to hospitals was often difficult.

It was realized that in starting a program with no precedent for organization, it would be impossible to attain perfection immediately. From the beginning, every means of evaluating the work as it progressed has been employed. In 1934, after eight years of experimentation, the steps necessary to make the cancer clinics real factors in the community were deduced and a complete reorganization was begun. The transition has taken nearly two years and has resulted in group diagnosis, adequate x-ray service, good medical social records, adequate transportation facilities, and a teaching service in the clinics that is becoming more effective and more popular with the profession and the public.

Prior to reorganization, the Great Barrington, Greenfield, Leominster, and Montague clinics were discontinued.

During the process of reorganization, Berkshire County was divided into the Pittsfield and North Adams clinics, and Worcester North into Gardner and Fitchburg, and the Newton clinic was discontinued due to the small number of patients. In communities where clinics were being held in several hospitals, a combination in one hospital was effected.

New clinics were opened in Greenfield on February 1, 1935, Northampton September 5, 1935, in Boston at the Beth Israel Hospital November 5, 1935, Gloucester November 20, 1935, Newburyport December 11, 1935, and Hyannis September 22, 1936.

Social service has always been an integral part of the cancer program. Every patient attending the clinics has been regularly followed. Supervision of these workers was maintained by occasional visits to the respective clinic by the supervisor of social service, but the contact was not sufficiently close to warrant an equal degree of excellence in all cases. In the smaller clinics, the money expended for social service was too large in proportion to the number of cancer patients. With the reorganization, several of the smaller clinics united and a full-time State social worker cared for their needs. Since the reorganization, the Director has met with the supervisor of social service and all the social workers in a group conference once a month, and has discussed the various policies of social service in the clinics as well as the methods and importance of obtaining accurate clinic and follow-up records. The importance of this coordination of the activities of social service in the clinics has noticeably improved clinic service.

Teaching Clinics

It has long been recognized that the inability of the individual general practitioner to see a large number of cancer cases, particularly in the early stages, has been detrimental to any program for cancer control. Numerous studies have indicated that the average practitioner may see from two to four cases yearly and usually these of different types of cancer. The cancer clinics offered to the public a means for diagnosis. They did not offer the general practitioner the help he needed. In the early part of the program, attempts were made to remedy this situation by the Graduate Course in Cancer held April 23–25, 1929, by the regional demonstration clinics held during 1931, and by the Cured Cancer Clinics held April 5–6, 1932.

The situation improved, but the large majority of physicians were not reached. With the reorganization of the clinics, an established policy of at least four teaching clinics a year for each clinic was inaugurated. Men experienced in cancer in Boston, New York, and Baltimore have conducted these clinics and the general medical practitioner has been invited to attend the clinic nearest his home. Many physicians who have found it difficult to spend one or two days in Boston can easily arrange to spend two or three hours at the local clinic. Many are availing themselves of this opportunity and this augurs well for adequate cancer control.

Cancer Therapy

In the years preceding the Massachusetts cancer program, the number of physicians who felt competent to treat the disease was much greater than at present. Nearly every surgeon believed cancer to be his province and many general practitioners who were doing minor surgery attempted the treatment of some types of cancer. Other general practitioners who had seen few cancer cures felt that little could be done and believed palliative therapy sufficient.

At a later period, radium and x-ray therapy were added to the cancer armamentaria. Some radiologists considered that cancer should be treated exclusively by Roentgen rays and radium. In addition to the ethical practitioners, there were the irregular practitioners who resorted to humbug and quackery.

As the Massachusetts Cancer Program has advanced with its group diagnosis and its teaching clinics, some surgeons, radiologists, and pathologists are emerging who are becoming authorities on the diagnosis and treatment of the disease. They make a practice of exchanging ideas with one another so that their final opinion is of far greater value to the patient than was formerly the case. The general practitioner is becoming, in the words of the American Medical Association, "A well

informed family physician who is able to entertain symptoms, who appreciates his limitations, and who will refer his pay and indigent cases to a competent group for diagnosis, prognosis, and outline of treatment."

Education

The education of the lay public is a perennial problem. How to instruct individuals so they will not only have knowledge but will use their intellect in connection therewith and act upon that knowledge, is the crux of the whole situation. This problem is by no means limited to cancer. It embraces civilization. The most perfect method of instruction and one that has had the most far-reaching effects is the person-to-person small group approach of the twelve Apostles. For centuries they and those who followed them used this method and this alone. Later, the printed word largely replaced this type of teaching. The ease of disseminating information by means of newspaper and pamphlet overshadowed for a time the uncertainty of the reception of material circulated in this way. The Massachusetts Cancer Program followed the lead of more experienced educators and used the newspapers which were augmented by radio, pamphlets, and addresses. Many came to the clinics inspired by fear engendered by something they had heard or read. A few had cancer; the greater majority did not. The individual who read or heard something about cancer had no one to answer the questions that occurred to him concerning the disease. The newspapers do a great service in the generosity with which they allot space to the cancer problem. Through them many late cases of cancer are brought to the clinics, according to information gathered from the clinic records.

In evaluating this information, the more ancient form of education was revived with the thesis that fear alone is followed by flight and concealment, and that exact knowledge counteracts fear. An eminent pathologist in cancer remarked that just as antique furniture and other tangible property is inherited from our ancestors, so, too, are traditional ideas, habits, and superstitions. This reasoning accounts for the biggest obstacle in the control of cancer:—either an individual was bred in ideas that cancer was caused by contagion, or unboiled water, or any one of thousands of things, the avoidance of which would preclude the possibility of acquiring the disease; or he was bred in the traditional fallacy that cancer was hopeless and nothing could be done about it. Any attempt at adequate control of this disease must go back to the traditional fallacy and rationalize it before positive prevention and treatment can be introduced. The program of addresses to the public by local physicians who not only talk but answer the many questions that arise was the result of this type of reasoning, and in the two years of its operation has shown its superiority over other methods.

Cancer Studies

From its inception, the cancer situation in Massachusetts has been under constant scrutiny and has been periodically compared with the situation in other states and countries by means of statistical research. In addition, factors bearing on the etiology of cancer are constantly being studied by means of clinic, morbidity, hospital, and death records.

In 1933 a comprehensive study entitled "Cancer and Other Chronic Diseases in Massachusetts" was published by the Houghton Mifflin Company.

The following statistical papers have been published:

"House No. 400. General Court of Massachusetts," 1926.

"Cancer Studies in Massachusetts. 1. The Relationship between Cancer and Density of Population in Massachusetts," 1927.

"Results of the Massachusetts Cancer Campaign," 1928.

"Cancer Studies in Massachusetts. 2. Habits, Characteristics and Environment of Individuals With and Without Cancer," 1928.

"Progress in Massachusetts Cancer Program," 1928.

"Report of Graduate Course in Cancer," 1929.

"Cancer Studies in Massachusetts. 3. Cancer Mortality in Nativity Groups," 1929.

"The Cancer Program of Massachusetts," 1930.

"Cancer Studies in Massachusetts. 4. Why Do People Delay?" 1930.

"Massachusetts Cancer Program," 1931.
"State-Aided Cancer Clinics in Massachusetts," 1931.
"State-Aided Cancer Clinics as Seen by the Practicing Physician," 1931.
"Complete Records Aid Control of Cancer," 1931.
"Hospitalization of Cancer in Massachusetts," 1932.
"Economics of the Massachusetts Cancer Program," 1932.
"Change in the Massachusetts Cancer Trend," 1934.
"Progress in the Massachusetts Cancer Program," 1934.
"Excerpts and Statistics on Cancer," 1934.
"Cancer in Boston," 1934.
"The Massachusetts Cancer Program," 1936.

Other Cancer Publications

In 1931, after the cancer program had been in effect for five years, the "History of the Cancer Program in Massachusetts" was published. It was an historical study tracing the several converging trends which resulted in the establishment of the Massachusetts Cancer Program. "Social Work in Cancer in Massachusetts," a paper outlining social service in the new movement, was published the same year. The status of education at that time was described in a paper entitled, "Cancer Education in Massachusetts."

In 1934 a comprehensive study of the history of cancer was prepared and published. It was entitled "Historical Trends in Cancer."

There have been repeated editions of the two popular pamphlets entitled "The Whats and Whys of Cancer" and "The Massachusetts Cancer Program."

Cancer Clinic Bulletin

In the early years of the program, information was furnished physicians upon request. In 1932, the cancer clinic bulletin was started. Its circulation was limited to the physicians conducting the cancer clinics. A demand on the part of other physicians has increased the original circulation from 215 to 2,582. In addition to this, a special number of "The Commonhealth," devoted to the subject of cancer, was prepared and sent to every physician in the State in 1934.

Records

The first records used in the cancer clinics were extremely meagre and dealt largely with social economic problems. As the clinics improved in quality and as some of them inaugurated staff meetings to study their cases, the inadequacy of the records became manifest. Many changes were effected until gradually the present record evolved. This seems satisfactory to nearly everyone. A similar transition occurred in the records of the social workers. Their records, too, passed through several stages and were ultimately combined with the medical one. All these records are copied for the central office and studies made therefrom.

A few hospitals are transcribing their clinical data to the punch card system. Since the Pondville Hospital was opened, frequent attempts have been made to compile a satisfactory punch card for its data. This was finally accomplished in 1935 and eventually all Pondville records will be studied by the punch card system.

Tumor Diagnosis Service

Antedating the Massachusetts Cancer Program by seven years, a service for the pathological diagnosis of tissue suspected of malignancy has been furnished by the Department in cooperation with the Harvard Cancer Commission.

State-Aided Cancer Clinics

There are at present nineteen State-aided cancer clinics. Preliminary work has been finished for the opening of the twentieth at Fall River early in the next year.

During 1936, the number of individuals attending the State-aided cancer clinics increased 6.7 per cent over the preceding year, but the number of individuals with cancer increased 18.6 per cent. The new program of urging physicians to make use of the clinics for consultation is bearing fruit in increasing the number of individuals with cancer coming to the clinics and decreasing the number with non-cancer.

Apparently many conditions of an obviously non-cancerous nature are being weeded out in the physician's office.

While the effectiveness of the cancer clinics cannot be measured entirely by the death records, a comparison of the death records for the five years preceding the clinics with the five years ending 1935 showed a decrease of 0.3 per cent in the cancer death rate for females under fifty, a decrease of 4.1 per cent for females between fifty and seventy, and an increase of 5.8 per cent for females over seventy. Among males, increases occurred in all age groups—in the under-fifty age group 14.1 per cent, in the fifty to seventy age group 9.1 per cent, and in the over-seventy age group 23.1 per cent.

Duration of Life of Cancer Patients

The fallacy that individuals who have cancer must die with the disease is rapidly being relegated to the past with other superstitions. Records are now available for the number of individuals alive who have attended the cancer clinics. With over one quarter of all cancer cases alive nine years after coming to the clinic, and with the average symptoms of nearly a year's duration before coming to the clinic, the assumption is justified that much more is being accomplished than is realized by the general public.

Table III.—*Percentage of Patients With Cancer Attending State-Aided Cancer Clinics Alive at Yearly Intervals Following Clinic Admission*

	1927–1935
Lost or unknown	3.0
Alive 1 year after	68.0
Alive 2 years after	55.9
Alive 3 years after	49.0
Alive 4 years after	44.5
Alive 5 years after	40.5
Alive 6 years after	37.6
Alive 7 years after	34.2
Alive 8 years after	31.2
Alive 9 years after	27.0

Teaching Clinics

The most important advance made in the clinics this year is the increased number of teaching clinics. In the first year of reorganization, sixteen teaching clinics were held; in 1936 the number had been increased to forty-two; and the present indication points to a much larger number next year. The average number of physicians present at a teaching clinic in 1936 was twenty and the average number of patients twelve.

Table IV.—*Teaching Clinics*

Clinic	Number Held in 1935	Number Held in 1936	Consultants in 1936
Beth Israel	0*	0	
Boston Dispensary	0	0	
Brockton	0	2	Daland, Simmons
Fitchburg	2	5	Lund, Taylor, Warren, Meigs, Parsons & Rogers
Gardner	2	3	Warren, Simmons, Daland
Gloucester	0*	3	Leland
Greenfield	0*	4	Daland, Warren, McKittrick, Shedden
Hyannis	0**	2	Shedden, Greenough
Lawrence	4	5	Simmons
Lowell	0	1	Adair
Lynn	3	3	Daland, Warren, Meigs
New Bedford	0	1	Simmons
Newburyport	1*	9	Taylor
North Adams	1	2	Daland, Taylor
Northampton	0*	1	Warren
Pittsfield	1	0	
Pondville	0	0	
Springfield	0	0	
Worcester	2	1	Greenough
Total number held	16	42	

*Clinic opened in 1935.
**Clinic opened in 1936.

Social Service

Medical social service has an important part in all of the cancer clinics. The major service continues to be helping patients to an acceptance of treatment, assistance with the arrangements for hospital care, and continued follow-up during and after treatment. In many cases, however, there are more complex social problems which are being met.

Formerly, service was offered in any community to physicians wishing assistance with plans for their cancer patients. A change in this policy has been made, however, and the clinic social workers now limit their service to patients who have attended clinics. There is increasing volume of follow-up required, but the proportion of patients who are lost or who fail to accept treatment is low.

The Department supervisor of social service has continued to offer consultation service to social workers, nurses, and others, and has taken part in the programs of the schools of social work.

Cooperative Cancer Control Committees

The local Cooperative Cancer Control Committees are becoming increasingly effective units for the dissemination of knowledge concerning cancer. These committees are composed in each case of key people who have friendly and vital contacts with every type of group and individual represented in the community—religious, political, labor, racial, social, fraternal, patriotic, and service. It has been learned, by experience, that community study in a small town is just as essential as in a large one. Every small town is now being contacted first in the persons of several citizens as advisers. Before the organizers even start to work contacting the key individuals mentioned above, the whole set-up of the individual parts of the community and their relation to each other is studied. The former chronic disease surveyors, under an epidemiologist, then enter the community and contact every individual recommended by the local advisers. They fill out an individual card with all the facts of interest brought out in interviews with these persons. By organizing in this way, it is possible to organize several communities simultaneously. Once contacted, this group of individuals is formally organized at a public meeting at which members of the Division discuss community organization and the type of talk to be given by the physicians.

The members of the committee, in turn, contact representatives of every club in the community. These clubs arrange to have at least one meeting annually on cancer. A club does not have to have an impressive membership to become corporate in this plan. The small group of eight or twelve is an ideal size. The group, itself, determines the type of cancer talk it will have. Some groups prefer a formal talk followed by a question period, while others prefer the round-table discussion with the physician during which questions are asked. In any case, a question period is desirable. It is at these small group conferences in which an individual feels free to ask questions about cancer that the real basic educational work is done.

The local physician is the one who is asked to be the teacher in this program because the decline or increase in early detection of cancer is entirely in his hands; because he will obtain more cooperation from his community if it knows exactly what to do in case of early symptoms and what the early symptoms are; because the local physician knows his community; and because it has always been the natural prerogative of the physician to teach.

During the past year, sixty-nine communities have been organized. These, combined with the sixty-five organized last year, bring the total of Cooperative Cancer Control Committees organized to 134 with 1,906 cooperating organizations. It is estimated from present indications that the whole State will have been organized by the end of next year.

At the present time the total number of addresses given by the local physicians to organizations in these communities is not available, but an estimate of well over five hundred is very conservative.

TABLE V.—*Cooperative Cancer Control Committee Organization*

Communities Organized in 1936	Date of Organization	Number of Organizations Cooperating
Adams	June 2	44
Amesbury	Jan. 10	11
Ashby	June 22	7
Ashfield	Nov. 20	4
Athol	May 4	61
Barnstable	Feb. 28	41
Bernardston	Dec. 9	12
Bolton	May 13	9
Bourne	Jan. 30	18
Boxborough	May 28	2
Brewster	Mar. 30	9
Buckland	Nov. 10	7
Charlemont	Dec. 10	10
Chatham	Mar. 26	17
Colrain	Nov. 11	10
Conway	Dec. 1	7
Dalton	June 1	17
Deerfield	Oct. 14	3
Dennis	Mar. 6	7
Dunstable	May 27	5
Eastham	Mar. 31	5
Erving	Nov. 6	9
Falmouth	Jan. 22	23
Gill	Nov. 19	8
Groton	May 6	18
Harvard	June 16	9
Harwich	Mar. 10	17
Haverhill	Dec. 15	*
Hawley	Nov. 30	3
Heath	Nov. 24	3
Hubbardston	Oct. 15	9
Ipswich	May 27	25
Lancaster	Oct. 5	15
Lee	May 21	23
Lenox	May 22	18
Leominster	May 5	*
Leverett	Dec. 3	6
Leyden	Dec. 8	3
Littleton	Apr. 28	6
Lunenburg	June 30	16
Mashpee	**	
Monroe	Nov. 23	3
New Bedford	Apr. 30	*
New Salem	Nov. 12	5
Northfield	Nov. 9	27
Orange	Nov. 23	49
Orleans	Mar. 31	14
Pepperell	May 22	19
Phillipston	Nov. 9	4
Princeton	Oct. 13	6
Rowe	Nov. 17	2
Royalston	Dec. 7	6
Sandwich	Jan. 29	14
Shirley	June 18	9
Shutesbury	Nov. 5	2
Sterling	Oct. 2	13
Stow	June 9	15
Sunderland	Oct. 14	2
Tolland	**	
Townsend	June 4	15
Truro	Apr. 14	2
Tyngsborough	June 2	8
Warwick	Nov. 18	2
Wellfleet	Apr. 15	13
Wendell	Nov. 4	3
Westminster	Nov. 16	17
Whately	Oct. 14	2
Worcester	May 18	55
Yarmouth	Mar. 2	15

65 communities were organized in 1935 with 1,067 organizations cooperating, making the total for 1935 and 1936—134 communities organized with 1,906 organizations cooperating.

*Central committee has not completed report of cooperating organizations.
**Contacts have been made, but owing to small population a formal committee has not been organized.

Follow-up visits are made on all committees after organization to keep them interested in the work, to obtain progress reports, and in some cases to change committee membership. Approximately 150 such follow-up contacts have been made this year.

Studies

Owing to the extensive educational campaign, many of the workers who primarily devote their time to statistics have been doing parts of the educational project. This has necessitated considerable slowing up of the various studies. One statistical paper on diabetes has been printed, one on the fundamentals of epidemiology, one on the Massachusetts Cancer Program, one on cancer among Massachusetts club women, and a fifth on the evaluation of the cancer mortality is completed but not as yet published.

The data for the cancer and tuberculosis study, changing vital statistics, and the cancer clinic social service follow-up, as well as that for etiology of cancer, are about ready for analysis and papers on these subjects will probably be prepared next year.

A new study inaugurated this year is the quinquennial analysis of cancer admissions in general hospitals. The records were previously obtained for 1925 and again for 1930. This year the records for 1935 have been collected and comparisons will be drawn.

Mail, Pamphlets, and Visitors

The incoming mail amounted to over 6,500 pieces and the outgoing to over 35,000 pieces. This year over 50,000 pieces of literature have been distributed. These items show a progressive increase as would be expected with the expanding work. Pamphlets on cancer, diabetes, rheumatism, and heart disease comprised the bulk of the literature distributed.

About 500 visitors came to the office during the year for advice on various problems.

Tumor Diagnosis Service

The work of the Tumor Diagnosis Service has continued to increase. A total of 2,689 specimens were received, 114 more than the preceding year. Of these, 686 were from the Collis P. Huntington Memorial Hospital. A large number of specimens arrived from various State-aided cancer clinics.

The follow-up of selected cases initiated last year proved helpful and is being continued to a minor degree. As has always been the case, the Tumor Diagnosis Service has been utilized by the smaller hospitals and by those surgeons without laboratory facilities. Consequently, it is felt that it plays a very real part in the State cancer control program.

A list of the hospitals and the number of surgeons, by towns, who have sent in specimens, is shown in Tables XIX and XX.

Publications from the Laboratory include:

"The Fate of Intravenously Injected Tumor Cells" Shields Warren, M.D., and Olive Gates, M.D., Am. J. Cancer 27:485, 1936.

"Fibrosarcoma of the Soft Parts with Special Reference to Recurrence and Metastasis" Shields Warren, M.D., and George N. J. Sommer, M.D., Arch. Surg. 33:425, 1936.

"The Value of Histologic Differentiation of Basal Cell Carcinomas" Shields Warren, M.D., Olive Gates, M.D., and Paul W. Butterfield, M.D., N. E. J. M. 215: 1060, 1936.

The special study of skin tumors is being actively pursued and a good deal of additional information that should be of aid both in diagnosis and treatment has been obtained.

The Assistant Pathologist, Dr. Olive Gates, is continuing her experimental work on tumor metastasis, as well as aiding in the routine work. Dr. Paul W. Butterfield completed his internship July 1, 1936.

Pondville Code

The transference of information from the Pondville record to a punch card is gradually being accomplished. The work necessarily has to be done slowly in order to be accurate.

Lectures

As the communities become organized for the Cooperative Cancer Control program, the State speakers are withdrawn from the area. In localities where no

program has as yet been organized, lectures are given on cancer and in any part of the State on chronic disease or on adult hygiene.

During the year, 151 lectures have been given in connection with organization of Cooperative Cancer Control Committees and thirty-nine lectures to other groups.

Radio and Newspaper

Until October 1st of this year, the radio schedule continued the same as in previous years with three weekly broadcasts—the Health Forum, the Health Review, and the Massachusetts Medical Society broadcasts. On October 1st, the local stations were taken over nationally and for a time all local programs were jeopardized. The Health Forum and the Massachusetts Medical Society talks were continued as usual. This entailed the forfeiture by the local stations of the American Medical Association broadcasts.

There were, in 1936, fifty-two broadcasts of the Health Forum, one of which was devoted to the National Tuberculosis Association; thirty-two broadcasts of the Health Review, three of which were allotted to the convention of the Massachusetts Medical Society; and thirty-seven regular Massachusetts Medical Society broadcasts.

Two articles from the Health Forum were printed weekly in the Boston Globe and one was sent to sixty-seven newspapers throughout the State.

Cancer Clinic Bulletin

The cancer clinic bulletin, designed primarily for physicians working in the cancer clinics, is now being sent to nearly half the practicing physicians in the State.

The inclusion of all the physicians in Massachusetts in the educational work of the Cooperative Cancer Control Committees has resulted in constantly increasing demands for information on cancer and for material that might be adapted to their needs as teachers in this program. In September, every physician in the State was sent a letter asking for comments on the cancer program, together with a copy of the cancer clinic bulletin, the popular number of "The Massachusetts Cancer Program," "The Whats and Whys of Cancer," and a reprint of "The Massachusetts Cancer Program," by Chadwick and Lombard. In response to this request and in addition to the original 1,700 physicians wanting the bulletin, there have been over 800 requests from physicians who had not requested the bulletin before and the requests are still coming in. There were several hundred physicians who commented on the program, some with lengthy statements of commendation, and others with a simple statement of approval. In all the answers so far received, there has been only one physician who disapproved. He did not understand the nature of the clinics and felt that the State should furnish money to individuals who could not afford to pay so that they might pay the private physician.

The following were the subjects of the cancer clinic bulletins for 1936:

"The Massachusetts Cancer Program."
"Prognosis of Simple Moles and Melanotic Sarcoma."
"The Responsibility of the Practitioner in Menopausal Bleeding."
"Sample Addresses Written by Different Physicians" (three bulletins).
"Fundamentals in the Cancer Problem."
"Carcinoma of the Uterine Cervix."
"Some Points in Early Diagnosis of Gastro-Intestinal Cancer."
"The Medical Care of the Cancer Patient."
"The Evidence for an Endocrine Factor in the Etiology of Mammary Tumors."
"Seven Steps to the Undertaker."

History of the Department

"A History of the Massachusetts Department of Public Health" was prepared by a member of this Division.

Consultant in Statistical Research

The facilities made available by the Division of Adult Hygiene of expert statistical advice and evaluation of methods and data in research are being used by

progressively increasing numbers of research workers. All papers from Pondville seek this appraisal and interdepartmentally this cooperative service continues to be used as in previous years.

In the past year, the advice of the statistical consultant has been sought by surgeons, pathologists, and internists, as well as members of the Department.

Statistics of the State-Aided Cancer Clinics

Table VI.—The number of cancers that have appeared in the State-aided cancer clinics during the past ten years is shown in this table. Cancer of the buccal cavity comprised 15.8 per cent, cancer of the breast 15.6, cancer of the skin 32.4, and cancer of the uterus 10.4. More than three quarters of the cancers which are seen at State-aided clinics are in sites where recognition is relatively easy and where the best opportunities for cure exist.

Table VII.—The number of individuals attending the State-aided cancer clinics in 1936 was 3,900. Cancer cases comprised 31.5 per cent of the total. Twelve hundred and twenty-nine individuals were seen with cancer. These individuals had 1,313 cancers and appeared 1,307 times at clinics. The percentage of individuals with precancerous lesions was 9.2.

Table VIII.—The attendance at individual clinics is shown in this table as well as whether or not the patients were referred by physicians.

Table IX.—The number of cities and towns from which individuals came to the cancer clinics showed a slight increase in 1936 over 1935.

Table X.—The median duration of delay before the first visit by the patient to a physician showed appreciable improvement. A slight improvement occurred in the duration of delay before the first visit to a clinic.

Table XI.—The percentage of cancer patients who came to the clinics referred by physicians has again increased while those referred by newspapers showed the lowest figure since the program was inaugurated.

Table XII.—The distribution of cancers in individuals coming to the clinics is shown in this table.

Table XIII.—The diagnosis of previous years was changed in 1936 in 162 cases and eight diagnoses made in previous years, which inadvertently had been omitted, were recorded. In Table I the changes in diagnoses have been brought up to date. These changes account for the slight discrepancies between Table I and figures for similar items in preceding reports.

Table XIV.—The contact of the patients with cancer with physicians is shown in this table. This table is very satisfactory as it shows a tendency for patients to come to the clinics through their physician and for the first physician consulted to refer the patient to the clinic.

Table XV.—Cancer of the breast, buccal cavity, and skin comprised the main groups of patients who came to the clinics without consulting a physician, but all three of these groups showed smaller percentages in 1936 than in 1935.

Table XVI.—The symptoms that first brought patients to clinics closely resembled those of previous years.

Table XVII.—The type of cancer by location, subdivided by the clinic's opinion as to prognosis, is shown in this table.

Table XVIII.—The diagnoses of various conditions found among the patients in the clinics are shown in this table. As some individuals had more than one condition, there were more diagnoses given than the total number of patients. The percentage of primary cancers showed a considerable increase.

TABLE VI.—*Location of Cancer in Patients Who Came to Clinics During Ten-Year Period 1927–1936*

Location of Cancer		Number
Buccal Cavity		1,274
Cheek	153	
Jaw	70	
Lip	589	
Mouth	120	
Pharynx	30	
Throat	19	
Tongue	203	
Others	90	
Digestive Tract		924
Anus	8	
Colon and Sigmoid	100	
Esophagus	96	
Gall-bladder	13	
Intestine	15	
Liver	19	
Mesentery	2	
Pancreas	27	
Peritoneum	9	
Rectum	295	
Stomach	304	
Cecum	14	
Others	22	
Respiratory System		163
Bronchi	10	
Larynx	82	
Lung	26	
Mediastinal	7	
Nasal Cavity	9	
Nasopharynx	10	
Pleura	1	
Trachea	1	
Others	17	
Uterus		839
Cervix	659	
Uterus	178	
Others	2	
Other Female Genitals		141
Fallopian Tubes	1	
Ovary	66	
Vagina	27	
Vulva	35	
Others	12	
Breast		1,253
Breast	1,225	
Nipple	10	
Paget's Disease	15	
Others	3	
Male Genitourinary		260
Bladder	67	
Kidney	20	
Penis	36	
Prostate	107	
Testicle	17	
Others	13	
Skin		2,605
Chin	42	
Ear	211	
Eyelid	129	
Face	934	
Nose	618	
Skin	271	
Others	400	
Other and Unspecified		451
Arm and Leg	51	
Bladder (female)	22	
Bone	37	
Eye	24	
Kidney (female)	8	
Neck	69	
Pelvis	6	
Carcinomatosis	9	
Osteosarcoma	4	
Sarcomatosis	4	
Unspecified	56	
All Others	161	
Hodgkin's Disease and Leukemia		132
Total		8,042

TABLE VII.—*Attendance at State-Aided Cancer Clinics, 1936*

Total individuals attending clinics	3,900
Total individuals having cancer	1,229
Total individuals having precancerous lesions	359
Total individuals having postoperative cancer, no evidence of recurrence	131
Total attendance at clinics	4,072
Total cancer attendance at clinics	1,307
Total precancer attendance at clinics	389
Total postoperative cancer, no evidence of recurrence, attendance at clinics	151
Total diagnoses	4,123
Total cancer diagnoses	1,313
Total precancer diagnoses	441
Total postoperative cancer, no evidence of recurrence, diagnoses	154
Percentage of individuals with cancer	31.5
Percentage of individuals with precancerous lesions	9.2
Median age of total clinic patients	53.7
Median age of cancer patients	63.2

TABLE VIII.—*Attendance at State-Aided Cancer Clinics and Contact with Physician, by Individual Clinic, 1936*

Clinic	Attendance*			Cancer		All Others		Total	
	Males	Females	Total	Referred by Physician	Not Referred by Physician	Referred by Physician	Not Referred by Physician	Referred by Physician	Not Referred by Physician
Beth Israel	90	126	216	67	29	69	51	136	80
Boston Dispensary	102	163	265	82	18	117	48	199	66
Brockton	84	186	270	28	23	75	144	103	167
Fitchburg	21	59	80	18	4	29	29	47	33
Gardner	19	37	56	17	2	29	8	46	10
Gloucester	27	32	59	20	0	36	3	56	3
Greenfield	18	13	31	12	2	15	2	27	4
Hyannis	9	10	19	7	1	11	0	18	1
Lawrence	25	64	89	36	13	28	12	64	25
Lowell	60	125	185	26	17	44	98	70	115
Lynn	139	192	331	39	36	104	152	143	188
New Bedford	78	175	253	64	14	105	70	169	84
Newburyport	31	63	94	20	1	56	17	76	18
North Adams	13	10	23	6	1	11	5	17	6
Northampton	16	37	53	12	2	35	4	47	6
Pittsfield	9	13	22	3	2	10	7	13	9
Pondville	701	851	1,552	505	75	725	247	1,230	322
Springfield	57	132	189	24	8	75	82	99	90
Worcester	103	182	285	55	18	120	92	175	110

*Some individuals went to more than one clinic.

TABLE IX.—*Residents of Massachusetts Cities and Towns Attending State-Aided Cancer Clinics*

	1935	1936
Number of places with 1 patient	45	50
Number of places with 2–5 patients	87	85
Number of places with 6–9 patients	36	36
Number of places with 10 patients and over	71	83
Total number of places	239	254

TABLE X.—*Median Duration in Months Between First Symptom and First Visit to Physician and First Visit to Clinic, by Location of Cancer*

Location of Cancer	Median Duration Before First Visit to Physician		Median Duration Before First Visit to Clinic	
	1935	1936	1935	1936
Buccal cavity	4.1	3.3	5.9	5.1
Digestive Tract	4.2	3.7	7.3	6.7
Respiratory System	2.3*	3.8	6.9	6.7
Uterus	4.2	4.3	8.3	8.3
Other Female Genital Organs	3.8*	3.8*	5.8*	6.0*
Breast	4.1	4.2	6.5	6.8
Male Genitourinary Organs	1.8*	4.5	7.0	8.8
Skin	12.5	12.1	18.5	12.8
Other and Unspecified Organs	3.9	2.9	6.2	5.1
Total	6.1	5.0	9.1	8.6

*Based on less than 25 cases.

Table XI.—*Reason for Coming to Clinic, by Diagnosis*

Rate per 100*

Reason	Cancer		Precancerous Lesions		All Others		Total	
	1935	1936	1935	1936	1935	1936	1935	1936
Physician	74.0	79.9	55.2	63.7	51.4	60.8	58.2	67.2
Past Experience or Former Patient	16.3	15.1	29.9	33.6	13.2	11.5	15.8	15.0
Newspapers	5.3	2.4	7.3	3.6	17.7	9.3	13.1	6.5
Friends or Relatives	5.3	3.8	8.3	4.1	11.9	9.2	9.7	6.9
Social Worker or Nurse	7.0	3.7	14.8	4.8	6.9	6.2	7.8	5.2
All Others	4.7	4.8	3.4	2.0	5.7	7.8	5.2	6.2

*Does not total to 100 per cent as some individuals gave more than one reason.

Table XII.—*Location of Cancer*

Rate per 100

Location of Cancer	1935	1936
Buccal Cavity	15.9	12.4
Digestive Tract	13.5	14.0
Respiratory System	3.1	3.1
Uterus	9.6	9.6
Other Female Genital Organs	2.4	2.1
Breast	15.5	15.8
Male Genitourinary Organs	3.4	3.9
Skin	31.9	33.1
Other and Unspecified Organs	4.7	6.0

Table XIII.—*Correction in 1936 of Previous Years*

	Changed to Cancer	Changed from Cancer	Pondville Clinic Cases of Previous Years Recorded in 1936	Other Clinic Cases of Previous Years Recorded in 1936
Buccal Cavity	19	4	–	–
Digestive Tract	15	1	–	–
Respiratory System	3	4	–	–
Uterus	15	7	–	–
Other Female Genital Organs	1	–	–	–
Breast	22	6	–	1
Male Genitourinary Organs	6	4	1	–
Skin	31	14	1	1
Other and Unspecified Organs	5	3	–	–
Hodgkin's Disease	1	1	–	–
Precancerous Lesions	–	–	4	–
Total	118	44	6	2

Table XIV.—*Contact of Cancer Patients With Physician*

Rate per 100

	1935	1936
Referred by physician:		
One physician consulted	38.3	43.0
More than one physician consulted	33.7	35.3
Unknown	1.9	1.4
Not referred by physician:		
One or more physicians consulted	13.4	11.1
No physicians consulted	10.1	6.9
Unknown	2.6	2.3

TABLE XV.—*Contact of Cancer Patients with Physician, by Location of Cancer*

Rate per 100

Location of Cancer	No Physician		One Physician		Two or More Physicians	
	1935	1936	1935	1936	1935	1936
Buccal Cavity	11.8	7.0	49.1	55.7	39.1	37.3
Digestive Tract	1.4	1.1	45.4	39.3	53.2	59.6
Respiratory System	3.1	0.0	12.5	27.5	84.4	72.5
Uterus	5.0	2.4	38.4	51.6	56.6	46.0
Other Female Genital Organs	4.0	0.0	40.0	37.0	56.0	63.0
Breast	13.1	10.4	52.5	54.5	34.4	35.1
Male Genitourinary Organs	0.0	0.0	37.1	22.4	62.9	77.6
Skin	18.6	12.8	55.2	56.6	26.2	30.6
Other and Unspecified Organs	6.0	4.0	48.0	34.2	46.0	61.8
Hodgkin's Disease and Leukemia	0.0	0.0	33.3	27.8	66.7	72.2
Total	10.5	7.1	47.7	48.8	41.8	44.1

TABLE XVI.—*Symptoms that First Brought Patient to Clinic, by Diagnosis*

Rate per 100*

Symptoms	1936		
	Cancer	Precancerous Lesions	Total
Swelling	30.5	17.2	31.0
Ulceration	34.0	30.4	19.2
Discharge and Bleeding	15.5	16.1	17.7
Pain	24.0	9.5	28.1
Deformity	7.4	37.6	10.3
Loss of Weight	10.6	4.5	8.7
Malaise	1.7	0.9	2.4
Observation	1.8	0.0	2.4
Itching	1.2	2.7	1.5
Scaly Skin	0.5	3.6	0.8
Others	16.9	6.1	16.2
Unknown	0.4	0.0	0.2

*Does not total to 100 per cent, as multiple symptoms were given by some patients.

TABLE XVII.—*Type of Cancer, by Location of Cancer and Sex*

Rate per 100

Location of Cancer	Operable Cancer Probable Cure		Operable Cancer Possible Cure		Operable Cancer Palliative Measures Only		Inoperable Cancer	
	1935	1936	1935	1936	1935	1936	1935	1936
MALES								
Buccal Cavity	41.5	41.9	32.6	29.7	17.7	25.7	8.2	2.7
Digestive Tract	5.5	2.3	25.3	31.8	27.5	44.2	41.7	21.7
Respiratory System	7.4	0.0	14.8	24.2	33.3	57.6	44.5	18.2
Breast	0.0	50.0	50.0	0.0	0.0	50.0	50.0	0.0
Male Genitourinary Organs	5.7	2.0	20.0	42.0	34.3	40.0	40.0	16.0
Skin	80.3	78.1	17.8	18.6	1.4	2.6	0.5	0.7
Other and Unspecified Organs	16.7	8.8	25.0	23.5	16.7	50.0	41.6	17.7
Total	45.3	42.4	23.7	25.8	14.6	23.7	16.4	8.1
FEMALES								
Buccal Cavity	40.0	25.0	40.0	58.3	10.0	16.7	10.0	0.0
Digestive Tract	6.5	11.4	37.0	40.9	26.1	29.5	30.4	18.2
Respiratory System	0.0	0.0	0.0	20.0	50.0	60.0	50.0	20.0
Uterus	11.3	5.7	39.2	38.2	26.8	45.5	22.7	10.6
Other Female Genital Organs	8.3	0.0	29.2	36.0	37.5	52.0	25.0	12.0
Breast	17.6	9.8	42.1	49.8	18.3	35.0	22.0	5.4
Skin	78.8	79.4	16.3	12.9	4.1	7.1	0.8	0.6
Other and Unspecified Organs	12.0	15.0	16.0	15.0	32.0	52.5	40.0	17.5
Total	30.6	27.0	32.5	34.4	18.5	31.3	18.4	7.3

TABLE XVIII.—*Diagnosis*

Rate per 100*

DIAGNOSIS	1935	1936
Cancer primary	18.4	21.9
Cancer with metastases	6.2	6.8
Cancer recurrent following operation	2.5	3.1
Original diagnosis non-cancer, changed to cancer	0.7	0.6
Original diagnosis postoperative cancer, changed to cancer recurrent	0.5	0.3
Original diagnosis precancerous lesions, changed to cancer	0.3	0.3
Diagnosed cancer at death	0.1	0.1
Original diagnosis postoperative cancer, changed to recurrent cancer of same site at death	0.1	0.03
Original diagnosis non-cancer, changed to cancer of same site at death	0.08	0.03
Original diagnosis postoperative cancer, changed to cancer of another site at death	0.03	0.0
Original diagnosis non-cancer, changed to cancer of another site at death	0.03	0.03
Original diagnosis Hodgkin's disease, changed to cancer	0.0	0.03
Original diagnosis cancer, changed to Hodgkin's disease	0.03	0.03
Original diagnosis non-cancer, changed to Hodgkin's disease	0.08	0.0
Hodgkin's disease and leukemia	0.7	0.4
Postoperative cancer, no evidence of recurrence	2.7	3.9
Original diagnosis cancer recurrent, changed to postoperative cancer	0.05	0.0
Original diagnosis cancer primary, changed to postoperative cancer	0.0	0.03
Benign tumors	14.7	10.0
Precancerous lesions	10.2	11.1
Original diagnosis cancer, changed to precancerous lesions	0.3	0.2
Original diagnosis cancer, changed to non-cancer	1.2	0.9
Original diagnosis Hodgkin's disease, changed to non-cancer	0.03	0.0
Diseases of the digestive system	8.2	7.2
Diseases of the circulatory system	1.6	1.5
Diseases of the genitourinary system	8.3	11.0
Diseases of the respiratory system	0.4	0.7
Diseases of the nervous system	0.8	0.7
Diseases of the skin	8.2	6.8
Mouth lesions	2.8	1.8
Diseases of the bone	0.5	0.5
Diseases of the eye and ear	0.2	0.05
Tuberculosis	0.7	0.4
Diabetes	0.2	0.2
Pernicious anemia	0.05	0.08
Rheumatism	0.4	0.4
Goitre	0.2	0.2
Syphilis	0.5	0.4
Endocrine dysfunction	0.2	0.05
Undiagnosed	2.9	2.3
Deferred	0.0	1.8
No pathology	4.7	4.8
Non-cancer, diagnosis not established	1.2	0.7
All others	3.4	4.3

Postoperative cancer means postoperative cancer with no evidence of recurrence.
*Does not total to 100 per cent, as some individuals had more than one diagnosis.

TABLE XIX.—*Tumor Diagnosis Service, 1936*

Specimens were received from hospitals listed below:

Acushnet Sanitarium and Hospital, New Bedford
Addison Gilbert Hospital, Gloucester
Angell Memorial Hospital, Boston
Anna Jaques Hospital, Newburyport
Audubon Hospital, Boston

Baker Clinic, Boston
Barr Sanitarium, Lawrence
Bay State Hospital, Boston
Belchertown State School, Belchertown
Bellevue Hospital, Boston
Benson Hospital, Haverhill
Bessie Burke Memorial Hospital, Lawrence
Boston Lying-in Hospital, Boston
Bridgewater State Hospital, Bridgewater
Brockton Hospital, Brockton
Burbank Hospital, Fitchburg

Cable Memorial Hospital, Ipswich
Cambridge Relief Hospital, Cambridge

Cape Cod Hospital, Hyannis
Carney Hospital, South Boston
Central Hospital, Somerville
Charlesgate Hospital, Cambridge
Chester Hospital, Cambridge
Chestnut Street Hospital, Milford
Chicopee Hospital, Chicopee
Choate Memorial Hospital, Woburn
Clinton Hospital, Clinton
Clover Hill Hospital, Lawrence
Commonwealth Avenue Hospital, Boston
Cooley Dickinson Hospital, Northampton
Cousen's Hospital, Waltham
Crocker Hospital, East Pepperell

Danvers State Hospital, Hathorne
Dedham Emergency Hospital, Dedham
Dover Street Clinic, Boston
Ducy Hospital, Brockton

East Cambridge Emergency Hospital, East Cambridge
Elmhurst Hospital and Sanitarium, Weymouth
Emerson Hospital, Forest Hills

Fairlawn Animal Hospital, Wakefield
Fairview Hospital, Great Barrington
Forest Hills Hospital, Jamaica Plain

Gale Hospital, Haverhill
Gardner State Colony, Gardner
Glover Memorial Hospital, Needham
Glynn Hospital, Dorchester
Groton Hospital, Groton

Harley Hospital, Dorchester
Haverhill Municipal Hospital, Haverhill
Henry Heywood Memorial Hospital, Gardner
Hillcrest Hospital, Pittsfield
Holden District Hospital, Holden
Holyoke Hospital, Holyoke
House of Mercy Hospital, Pittsfield

Irving Hospital, Framingham

Jordan Hospital, Plymouth

Lawrence General Hospital, Lawrence
Lawrence Municipal Hospital, Lawrence
Leominster Hospital, Leominster
Louis Pasteur Hospital, Worcester
Lowell General Hospital, Lowell
Ludlow Hospital, Ludlow
Lynn Hospital, Lynn

MacLeod Hospital, Boston
Martha's Vineyard Hospital, Martha's Vineyard
Mary A. Alley Emergency Hospital, Marblehead
Mary Lane Hospital, Ware
Massachusetts Osteopathic Hospital, Jamaica Plain
Memorial Clinic, Holyoke
Memorial Hospital, Worcester

Metropolitan State Hospital, Waltham
Middlesex Hospital, Cambridge
Millers River Hospital, Winchendon
Milton Hospital, Milton
Moore Hospital, Brockton
Morris Home, Bradford
Morton Hospital, Taunton
Mt. Hope Hospital, North Dighton

Nantucket Cottage Hospital, Nantucket
New England Baptist Hospital, Boston
New England Hospital for Women and Children, Roxbury
New England Sanitarium and Hospital, Melrose
Noble Hospital, Westfield
Norwood Hospital, Norwood
Notre Dame Hospital, Mansfield

Ocean View Hospital, Lynn

Plymouth County Hospital, Plymouth
Providence Hospital, Holyoke

St. Anne's Hospital, Fall River
St. Joseph's Hospital, Lowell
St. Luke's Hospital, Middleborough
Somerville Hospital, Somerville
Springfield Hospital, Springfield
State Farm, State Farm
State Prison Colony, Norfolk
Sturdy Memorial Hospital, Attleboro
Sunnyside Hospital, Somerville

Thomas, J. B., Hospital, Peabody
Trumbull Hospital, Brookline

Union Hospital, Lynn
Union Hospital, New Bedford

Vincent Memorial Hospital, Boston

Webster District Hospital, Webster
Wesson Memorial Hospital, Springfield
Whitinsville Hospital, Whitinsville
Wing Memorial Hospital, Palmer
Winthrop Community Hospital, Winthrop
Worcester City Hospital, Worcester

TABLE XX.—*Tumor Diagnosis Service, 1936*

City or Town	Number of Surgeons Sending in Specimens	City or Town	Number of Surgeons Sending in Specimens
Arlington	1	Nahant	2
Ashburnham	1	Natick	1
Athol	1	Needham	1
		New Bedford	6
Bedford	1	Newburyport	1
Belmont	2	Norfolk	1
Beverly	2	Northampton	3
Boston	55	North Andover	1
Bridgewater	1	Northbridge	2
Brockton	6	Norton	1
Brookline	1	Norwood	1
Cambridge	3	Oak Bluffs	1
Canton	1	Orange	1
Chelsea	3		
Conway	1	Palmer	3
		Peabody	4
Danvers	1	Pittsfield	6
Dedham	2	Plymouth	6
East Bridgewater	1	Quincy	1
Easthampton	1		
Essex	1	Reading	1
Everett	1	Revere	3
Fitchburg	3	Salem	2
Framingham	1	Scituate	1
		Sharon	1
Gardner	5	Shelburne	1
Georgetown	1	Somerville	10
Great Barrington	1	Southwick	1
Greenfield	2	Springfield	6
Groton	2	Stoneham	1
		Swampscott	1
Haverhill	6		
Holyoke	4	Taunton	1
Hudson	1		
Hull	2	Walpole	2
		Waltham	1
Lawrence	11	Ware	1
Lee	1	Wareham	1
Leominster	1	Warren	1
Littleton	1	Watertown	3
Longmeadow	1	Wellesley	1
Lowell	3	Westfield	5
Lynn	23	Weymouth	2
		Winchendon	3
Malden	4	Winthrop	2
Marshfield	1	Woburn	1
Mattapoisett	1	Worcester	5
Medford	2		
Medway	1		
Melrose	1		
Merrimac	1		
Methuen	2		
Middleborough	1		
Milford	2		
Milton	2		
Monson	1		
Montague	1	Total	274

REPORT OF DIVISION OF BIOLOGIC LABORATORIES

ELLIOTT S. ROBINSON, M.D., PH.D., *Director*

ROY F. FEEMSTER, M.D., *Assistant Director*

The work of the Division of Biologic Laboratories continues to increase. In the Wassermann Laboratory this increase is in the number of specimens examined, but in the Antitoxin and Vaccine Laboratory the increase is in the diversity of products distributed rather than in volume of distribution. The institution of programs supported by Federal funds granted under the Social Security legislation has widened the variety of work in both laboratories.

1. ANTITOXIN AND VACCINE LABORATORY

1. Distribution of Products

Diphtheria	1932	1933	1934	1935	1936
Antitoxin, 1,000 unit doses	195,648	164,587	141,238	103,152	78,222
Schick Outfits, 50 doses each	7,748	7,100	7,084	5,954	5,109
Toxin-Antitoxin Mixture, 1 cc. doses	420,003	461,930	373,467	214,817	148,372
Toxoid, 1 cc. doses	1,557	22,002	125,731	209,760	218,857
Toxoid (Bulk) cc.	1,100	–	–	–	–
Toxoid, Alum Precipitated, 1 cc. doses	–	–	–	110	–
Toxin (Bulk) cc.	265	10	175	115	300
Scarlet Fever					
Convalescent Serum, vials	–	231	605	302	101
S. F. Streptococcus Antitoxin, doses	–	2,207	2,568	2,490	1,873
S. F. Streptococcus Toxin, 5 cc. vials	–	128	700	718	805
S. F. Streptococcus Toxin, Heated Control, 5 cc. vials	–	–	–	256	568
S. F. Streptococcus Toxoid, 1 cc. doses	–	563	21,156	27,406	35,706
S. F. Streptococcus Toxin for immunization, 1 cc. doses	–	–	–	–	240
Pneumonia					
Antipneumococcic Serum, Conc. vials	2,609	2,957	2,382	3,717	3,438
Diagnostic Serums					
Pneumococcus Type I—horse, cc.	1,015	1,270	550	565	140
Pneumococcus Type II—horse, cc.	975	1,205	535	590	310
Pneumococcus Type III—horse, cc.	1,080	1,325	620	620	140
Pneumococcus Type V—horse, cc.	325	300	10	–	25
Pneumococcus Type I—rabbit, cc.	–	57	172	240	246
Pneumococcus Type II—rabbit, cc.	–	57	146	220	244
Pneumococcus Type III—rabbit, cc.	–	57	159	194	132
Pneumococcus Type V—rabbit, cc.	–	–	20	49	70
Pneumococcus Type VII—rabbit, cc.	–	–	–	–	3
Pneumococcus Type VIII—rabbit, cc.	–	–	10	56	48
Antipneumococcic Vaccine, Type II, 20 cc. vials	–	–	–	–	86
Measles					
Placental Extract, vials	–	–	36	7,490	5,114
Sodium Citrate Solution, vials	896	1,230	1,784	1,707	1,246
Meningitis					
Antimeningococcic Serum, 15 cc. doses	3,530	2,960	2,959	3,640	4,670
Antimeningococcic Serum, Conc. 15 cc. doses	–	–	–	29	–
Influenza (Pfeiffer Bacillus) Antiserum, vials	573	757	913	1,128	1,148
Influenza (Pfeiffer Bacillus) Antiserum (Bulk) cc.	–	–	200	–	–
Miscellaneous Serums					
Typhus Serum, 20 cc. vials	40	20	667	418	21
Typhus Serum (Bulk) cc.	–	100	100	–	4,000
Calf Serum, vials	–	–	40	–	–
Horse Serum, Normal cc.	31,395	20,865	19,960	29,959	58,830
Human Serum, Normal vials	–	22	45	–	–
Poliomyelitis					
Convalescent Serum, vials	714	951	502	1,276	556
Enteric Fevers					
Typhoid-Paratyphoid Vaccine, 1 cc. doses	88,908	89,297	98,412	95,356	188,118
Diagnostic Serums					
Typhoid, cc.	26	22	14	10	12
Paratyphoid A, cc.	32.5	25	15	10	5
Paratyphoid B, cc.	35	25	15	10	5
Flexner Dysentery Vaccine (dried) capsules	–	–	4,000	6,000	6,130
Flexner Dysentery Vaccine, 20 cc. vials	–	–	10	–	–

Other Products					
Smallpox Vaccine, capillary tubes	350,727	274,957	289,981	256,584	231,602
Tuberculin (ampoules—0.7 cc.)	1,925	2,362	3,630	4,050	4,265
Tuberculin (bulk) cc.	550	–	–	–	–
Silver Nitrate Solution (ampoules)	61,586	60,399	60,284	59,164	65,493
Typhoid-H antigen, 5 cc. vials	–	–	–	160	11
Syphilis					
Arsphenamine, 0.3 gram (ampoules)	10	339	–	–	–
Arsphenamine, 0.4 gram (ampoules)	590	202	125	109	160
Arsphenamine, 0.6 gram (ampoules)	1,520	1,602	1,119	1,350	1,450
Arsphenamine, 3.0 gram (ampoules)	2,510	2,280	2,440	2,095	1,995
Sulpharsphenamine, 0.3 gram (ampoules)	1,676	2,045	1,780	1,932	2,137
Sulpharsphenamine, 0.4 gram (ampoules)	1,526	1,382	660	997	518
Sulpharsphenamine, 0.6 gram (ampoules)	7,033	4,655	4,800	3,127	2,622
Sulpharsphenamine, 1.0 gram (ampoules)	1,108	200	260	353	217
Sulpharsphenamine, 3.0 gram (ampoules)	661	268	180	100	89
Neoarsphenamine, 0.45 gram (ampoules)	8,606	12,320	14,948	16,610	17,010
Neoarsphenamine, 0.6 gram (ampoules)	26,099	32,050	32,170	35,060	34,119
Neoarsphenamine, 0.9 gram (ampoules)	9,203	13,880	18,200	18,520	17,320
Mapharsen, 0.04 gram (ampoules)	–	–	–	150	1,125
Mapharsen, 0.06 gram (ampoules)	–	–	–	150	1,500
Bismuth Salicylate in oil (2 oz. bottles)	–	–	–	–	947

1. Diphtheria Antitoxin.—Decreasing need for this product is reflected in the smaller amount distributed, but part of the decrease in distribution is also due to more economical distribution arrangements.

2. Diphtheria Toxin-Antitoxin Mixture and Diphtheria Toxoid.—The combined distribution of these products continues to fall, largely because there are few communities left where extensive immunization programs have not already been undertaken. These products have been displaced to some extent here and certainly in other states by diphtheria toxoid, alum precipitated, although we believe this change is not yet warranted. The continued use of toxin-antitoxin mixture, except in special instances, does not appear to be desirable and should be discouraged.

3. Scarlet Fever Streptococcus Toxins and Toxoid.—These are used in the study described below.

4. Antipneumococcic Serums.—Although a slightly smaller number of vials of therapeutic serum was distributed than in 1935, the number of units per vial has averaged somewhat more. Therapeutic serums for Types I and II have been distributed and serums for Types V, VII and VIII are in preparation.

5. Antipneumococcic Vaccine, Type II.—This was used in the outbreak of Type II pneumonia described by Smillie (Am. J. Hyg. 1936, Vol. 24, p. 522). Part of the work of preparing the vaccine was carried out at this laboratory.

6. Antimeningococcic Serum.—More was distributed in 1935 than in any year since 1930.

7. Typhoid-Paratyphoid Vaccine.—The floods in March caused a sudden and unprecedented demand which could not be entirely filled with the stocks of vaccine on hand. Additional supplies obtained from the Army Medical School in Washington served to tide us over until fresh lots of vaccine could be prepared here.

8. Smallpox Vaccine.—The 1936 distribution figure is the lowest since 1923, owing both to the absence of smallpox and to improved distribution arrangements.

9. Silver Nitrate Solution.—The regulation requiring the use of silver nitrate instead of other prophylactics for the prevention of ophthalmia neonatorum is undoubtedly responsible for the increased demand for this product.

10. Typhoid-H Antigen.—This is a typhoid vaccine prepared for use for fever therapy at one of the mental disease hospitals.

11. Arsenicals and Bismuth.—These are distributed under the direction of the Division of Communicable Diseases.

The semi-annual inspection of distributing stations by the district health officers and the arrangement by which, in the larger communities, all orders for products other than antimeningococcic and antipneumococcic serum and arsenicals go through the board of health, have led to less waste of products through over-ordering. Some improvement is still possible, particularly in a few communities where there are too many branch distributing points.

The arrangements for distributing antipneumococcic serum function reasonably well and no objection to the method has come to our attention. The serum is available at the sixty-odd laboratories where typing is done, and the location of these laboratories is such that serum is reasonably accessible in all parts of the State.

2. *Expenses*

Year	Personal Services		Expenses		Total	
	Appropriation	Spent	Appropriation	Spent	Appropriation	Spent
1932 . .	$71,500 00	$71,481 70	$37,314 70	$35,528 06	$108,814 70	$107,009 76
1933 . .	66,860 00	65,699 94	34,768 41	31,945 31	101,628 41	97,645 25
1934 . .	63,530 00	62,478 89	38,234 98	33,417 44	101,764 98	95,896 33
1935 . .	70,970 00	69,976 74	37,662 06	33,768 19	108,632 06	103,744 93
1936 . .	77,680 00	77,416 32	36,500 00	35,441 04	114,180 00	112,857 36

The increased amount expended for personal services is traceable to salary increases and to the inclusion in our payroll for the full year of the personnel taken over from the Pneumonia Study and Service in 1935.

The increase in expenses was caused in part by higher commodity prices and in part by certain expenses incurred in the preparation of typhoid-paratyphoid vaccine for the flooded areas, which could not be segregated and charged against the special appropriation for that emergency.

3. *Improvements*

Except for the usual maintenance work and minor additions to equipment, no changes have been made in the buildings or equipment. The increasing variety of our products and the prospective increase of personnel will tax our accommodations for space. At present the most pressing need is for additional refrigeration space, which may prove difficult to provide.

4. *Personnel*

No change has been made in the number or grades of regular positions but provision has been made under the Social Security Appropriation for a new position in each of the following grades: Assistant Director, Senior Chemist, Junior Bacteriologist, Laboratory Helper (2 positions), and Stableman. The Assistant Director is seriously needed but no one has yet been found who is both fitted for the position and willing to take it.

5. *Educational Activities*

The educational activities of the Laboratory have been carried on as usual through demonstrations for medical and public health students, attended by 389, through a course in Applied Immunology, and through participation in the Simmons College graduate course for Laboratory Technician training. The Director and Assistant Director gave three talks outside the Laboratory, attended by about 400 people. Laboratory workers from Canada, India and France visited the Laboratory.

6. *Investigation*

(*a*) An intensive study of the preparation of diphtheria toxin on the synthetic media devised by Dr. J. H. Mueller of the Harvard Medical School has been conducted by Dr. A. M. Pappenheimer, Jr., a voluntary worker in this laboratory. He has succeeded in producing high-grade toxin and in purifying it. This work is reported in part in the two papers listed below.

(*b*) Doctor Pappenheimer's work is receiving practical application in the preparation of diphtheria toxoid. This toxoid has not yet been tried for human immunization, but there is every reason to believe that it will be satisfactory and may prove to be even more bland than the present product.

Should alum-precipitated toxoid prove satisfactory, its preparation from these purer toxoids should be easy and the products would be uniform.

(*c*) A flocculation method for titrating streptococcus toxins and antitoxins has been developed by Doctor Rane and is in use for following the immunization of the scarlet fever streptococcus antitoxin horses and the production of toxin. This method may prove as great an aid in the study and improvement of scarlet fever products as did the analogous method developed by Ramon for diphtheria products.

(*d*) The results of the field-study of scarlet fever streptococcus toxoid will be found in the report of the Division of Communicable Diseases. Improvements in methods of producing the toxoid are under study in this laboratory.

(*e*) Although the Pneumonia Study and Service ceased as a separate organization at the end of 1935, the routine and investigative work have continued. A study of an apparent spontaneous transformation of a Type V to a Type II pneumococcus has been concluded and the results published. The preparation of therapeutic and diagnostic serums for Types V, VII, and VIII has been begun but none of the therapeutic serum has yet been distributed. Although our experience with Type I and Type II serums is of great assistance in the preparation of serums for these other types, yet some problems have already been encountered and others will undoubtedly arise which will demand investigation. Methods of concentrating antipneumococcic serums are still under investigation, but have not yet yielded entirely satisfactory results.

(*f*) The study of placental extract for the prevention or modification of measles is continuing. The work is badly handicapped by the lack of a simple method of testing the potency of the extract, and no solution to this problem is readily apparent. Methods of preparing the extract are not yet entirely satisfactory. This work is carried on in association with the Department of Pediatrics of the Harvard Medical School.

(*g*) The production of antimeningococcic serum by the use of freshly isolated, virulent cultures and the determination of the potency of the product by protection tests in mice have been undertaken, with promising preliminary results. The increased prevalence of meningococcic meningitis makes the production of a more effective serum a matter of immediate importance.

(*h*) Some of the newer ideas of the preparation of typhoid vaccine have been studied and a method of testing antigenic value in mice is being developed. A satisfactory method of standardizing the bacterial content of the vaccine has been found and put into routine use. This method has been published.

(*i*) Assistance was given to the Department of Public Safety in the preparation of antiserums for the identification of blood-stains.

7. *Publications*

The six papers published in 1936 are listed on page 25.

II. Wassermann Laboratory

William A. Hinton, M.D., *Chief of Laboratory*

1. *Tests and Examinations*

The number of specimens received and tests performed continues to increase rapidly. Specimens for the serologic examination for evidence of syphilis increased from 133,488 in 1935 to 155,978 in 1936 or nearly 17 per cent. The samples for examination of Brucella abortus agglutinins show an even larger relative increase, the 1936 figure being nearly one-third higher than the figure for 1935.

Under the Social Security Appropriation, plans are being made for a survey of the accuracy of the serological examinations for syphilis conducted in the various laboratories in the State. This will be carried out in a manner similar to the surveys conducted by the United States Public Health Service.

Also under this appropriation studies are being made of cultural methods for the diagnosis of gonococcus infection and of the influence on serologic reactions of lengthening the interval between injections of arsphenamine. These investigations have been started too recently to warrant any further statement.

	1932	1933	1934	1935	1936
Wassermann Tests	100,948	106,211	40,125	17,477	20,036
Kahn Tests	15,059	18,541	4,260	–	–
Hinton Tests	22,167	30,371	95,036	127,488	145,137
Gonococcus Fixation Tests	3,195	3,657	4,343	5,209	6,619
Lange's Colloidal Gold Tests	107	106	178	158	127
Complement Fixation Tests for Glanders	27	74	37	29	25
Agglutination Tests for Brucella Abortus	258	–	–	–	–
Diagnostic Examinations for Division of Live Stock Disease Control:					
(a) Complement Fixation Tests for Glanders	5	11	17	12	6
(b) Examination for Rabies	265	301	496	491	335
(c) Pathologic and Bacteriologic Examinations	22	21	14	5	20
(d) Agglutination Tests for Brucella Abortus	10,077	11,921	14,653	17,701	23,300
	152,130	171,214	159,159	168,570	195,605

2. *Expenses*

Year	Personal Services		Expenses		Total	
	Appropriation	Spent	Appropriation	Spent	Appropriation	Spent
1932	$17,000 00	$16,409 86	$5,200 80	$5,144 12	$22,200 80	$21,553 98
1933	15,990 00	16,654 38	5,000 00	4,916 27	20,990 00	20,570 66
1934	15,700 00	15,498 99	5,219 45	5,142 48	20,919 45	20,641 47
1935	16,990 00	16,580 64	5,201 00	5,188 25	22,191 00	21,768 89
1936	18,110 00	18,015 58	5,800 00	5,502 30	23,910 00	23,517 88

Although the total expenditure is larger than in 1935, the cost per test has been reduced to about 12.2 cents.

3. *Education*

In addition to the routine activities, the Wassermann Laboratory has furnished instruction to men in the second-year class of the Harvard Medical School. There was also a special class of fifteen senior students from Simmons College; and instruction was given to four special students from the graduate department of Simmons College.

REPORT OF THE DIVISION OF CHILD HYGIENE

M. Luise Diez, M.D., *Director*

During the year ending December 31, 1936, the activities of the Division of Child Hygiene were chiefly the following:

I. Activities of the Various Sections:

1. *Federal Social Security Act.*

2. *Maternal, Infant and Preschool Hygiene:*
   - (*a*) Maternity Service
   - (*b*) Mothers' Classes
   - (*c*) Premature Infant Program
   - (*d*) Well Child Conferences
   - (*e*) Health Survey of Preschool Children
   - (*f*) Nursery Schools
   - (*g*) Summer Round-Up

3. *School Hygiene:*
   - (*a*) Millville
   - (*b*) Sub-Committee on School Hygiene
   - (*c*) Advisory Committee on School Hygiene
   - (*d*) Study of Eighth Grade Children
   - (*e*) Test of Health Consciousness
   - (*f*) School Hygiene Surveys
   - (*g*) "Contact"
   - (*h*) School Physicians
   - (*i*) Audiometer Tests for Hearing

4. *Public Health Nursing:*
   - (*a*) School Nursing
   - (*b*) Tuberculosis Nursing
   - (*c*) Communicable Disease Nursing
   - (*d*) Hospital Training Schools
   - (*e*) Continuation Classes
   - (*f*) Institutes for Public Health Nurses
   - (*g*) Health Clubs
   - (*h*) School Lunch Program
   - (*i*) Crippled Child Program
   - (*j*) Scholarships for Nurses
   - (*k*) Premature Infant Nursing Program
   - (*l*) New England States Teaching Center
   - (*m*) General Nursing Service

5. *Nutrition:*
   - (*a*) Nutrition Advisory Committee
   - (*b*) Massachusetts Health Commission
   - (*c*) School Lunch
   - (*d*) Well Child Conferences
   - (*e*) Dental-Nutrition Service
   - (*f*) Community Nutrition Service
   - (*g*) Summer Camps
   - (*h*) Chadwick Clinics
   - (*i*) Home Visiting
   - (*j*) Nutrition Education
   - (*k*) Works Progress Administration
   - (*l*) The Spring Floods

6. *Dental Hygiene:*
   (*a*) Dental Certificate Program
   (*b*) Dental Clinics
   (*c*) Preschool Program
   (*d*) General

7. *Parent Education*

8. *Research Learning Project*

9. *New England States Teaching Center*
   (*a*) Nursing Service for Premature Infant Program
   (*b*) Nutrition Service

10. *Postgraduate Courses for Physicians*

11. *Health Education:*
   (*a*) Courses in "Charm"
   (*b*) Secondary Schools
   (*c*) Play Day—Child Health Day
   (*d*) Publicity
   (*e*) Exhibits, Posters, Pamphlets, etc.
   (*f*) Library
   (*g*) Lectures, Motion Pictures, etc.
   (*h*) Prenatal and Postnatal Letters and Fathers' Letter
   (*i*) Cooperation with Outside Agencies
   (*j*) Staff Education

II. Special Projects:
1. The Spring Floods
2. Audiometer Testing

III. Personnel.

I. Activities of the Various Sections

1. Federal Social Security Act:

The activities of the Division of Child Hygiene for the year ending December 31, 1936, were greatly augmented and several new activities launched when the passage of the Federal Social Security Act was assured. This was brought about through a grant of funds by the Children's Bureau of the United States Department of Labor, for the furtherance of the program for maternal and child care.

Much time was given to the discussion of the proposed program and personnel required to carry on this increased activity, with representatives of the Children's Bureau, the United States Public Health Service, and the Harvard School of Public Health.

One of the requirements was that an Advisory Committee on Maternal and Child Hygiene be appointed. This Committee includes the following: Dr. Warren R. Sisson, Dr. Richard M. Smith, Dr. Robert L. DeNormandie, Dr. Harold M. Teel, Dr. Frank A. Delabarre, Dr. Alice F. Blood, Miss Sophie Nelson, Mr. Herbert C. Parsons, Mr. Walter V. McCarthy, State Commissioner of Public Welfare, Mr. Theodore Lothrop, and Professor W. F. Dearborn of Harvard University. Two meetings of the Committee were held during the year.

This Federal program is planned primarily for rural districts. New work opened up through the grant of funds was principally in the fields of research learning, parent education, the care of the premature infant, and consultant service in the fields of obstetrics, pediatrics and dental hygiene.

Medical service for the preschool child was increased through the appointment of a second unit for the examination of children within this age group. This unit consisted of a physician, a public health nurse, a nutritionist, and a dental hygienist, concentrating largely upon the children attending nursery schools. Through this group also were conducted the preschool health surveys, made upon the request of the local communities.

Dental service was increased through the appointment of a pediatrician who is also a dentist, who is responsible for the dental program and activities of the Division of Child Hygiene and the supervision of the work of the dental hygienists carrying on dental inspections of children's mouths.

2. Maternal, Infant and Preschool Hygiene:

(*a*) *Maternity Service:*

The regular program of the Division in this field was carried on as usual throughout the year. At the close of the calendar year there were on the registry for the monthly prenatal letters, and letters to fathers, approximately 1,228 names, as compared with 860 the previous year; for the first year postnatal service, 14,027 names, as compared with 12,826 in 1935, and for the second year postnatal letter service a total of 13,680 names, as compared with 12,454 the previous year. This makes a total of 28,935 names of prospective mothers and fathers and mothers of children under two years of age receiving instruction in prenatal care, maternity care, and care of the baby during 1936, as compared with 26,140 during 1935.

Cooperation with the Framingham Reformatory for Women was continued, the public health nursing consultants of the Division contacting local nurses for plans for home visiting upon mothers and babies who had been discharged from the Reformatory during the year. The nursing consultants visited twelve of these personally.

Stimulated by the Maternity Institutes held during the previous year, greater activity has been carried on locally in the matter of securing adequate and early prenatal care for prospective mothers, as well as delivery and postpartum care. Mothers were urged to visit their physicians or attend prenatal clinics and to avail themselves of the prenatal and postnatal letter service of the Division.

(*b*) *Mothers' Classes:*

The usual assistance was given local communities by the Public Health Nursing Consultants in the formation of Mothers' Classes and in activities of importance for those already established. New classes were started in Medford. Particular interest was centered in three of the towns in the Nashoba Health District and in Amherst where three such classes were organized by the local nurse following stimulation by the Nursing Consultants of the districts concerned. In Hampden County the Nursing Consultant gave special talks to the mothers on "Infant Care" and "Care of the Preschool Child", at already established Mothers' Classes under the Hampden County Improvement League.

The Outlines for Mothers' Classes, provided by the Division, were used throughout the year. Plans for revision of these outlines are now under way.

(*c*) *Premature Infant Program:*

Early in June the Premature Infant Program, a new activity of the Division, was organized and personnel selected to carry on this program, the objectives of which are the reduction of deaths of premature infants and the improvement of standards for the care of the premature baby. To this end we are attempting to secure early and prompt reporting of premature births by physicians; the furnishing of hospital centers adequately equipped to care for prematures; the suitable transportation of prematures to the center where proper care can be given; the teaching of the care of premature infants to nurses, both public health and private duty, and to lay groups; and as a correlative, the stimulation of adequate prenatal supervision.

Work was begun in starting three centers in the State. A study was made of various types of transportation beds, and there have been prepared outlines for teaching and a leaflet on the care of prematures.

It was found necessary for the discussion of special subjects in regard to this program to form a sub-committee on the Premature Program, and there were appointed to this sub-committee a pediatrician, two obstetricians, the Commissioner of Public Health, the Assistant Director of the Division of Child Hygiene, as well as another physician of the Division, and the consultant nurse assigned to the premature infant work.

(*d*) *Well Child Conferences:*

Well Child Conferences were conducted by the original conference unit in 12 towns and a total of 617 examinations made. In this group it was found that 537 of the children, or 84%, had not been vaccinated, and 320, or 50%, had not been immunized against diphtheria. In five other towns this unit held conferences, with an outside physician doing the examinations, a total of 285 children being examined. In Nantucket and Gosnold and the six towns on Martha's Vineyard, a physician was employed locally but the other members of the unit assisted at these conferences where a total of 285 children were examined. Nursing follow-up reports were received from four towns where conferences were held in 1936—Amherst, Princeton, Sterling and Winchendon.

Many of the towns in which conferences were held had no resident physician, but in those towns where physicians were resident they were contacted by the conference physicians of the Division.

A summary of the Well Child Conference examinations for the years 1931 to 1936, inclusive, gives the following information:

TABLE I—*Summary of Examinations*

Year	Number Examined		Number with Defects		Percentage with Defects	
	Pre-school	Entering School	Pre-School	Entering School	Pre-school	Entering School
1931 . .	973	192	631	176	65	92
1932 . .	1,243	627	888	607	71	97
1933 . .	1,100	549	900	518	82	94
1934 . .	989	510	835	493	85	97
1935 . .	709	625	600	591	85	95
*1936 . .	2,813	703	2,647	680	94	97

TABLE II—*Defects Found*

Year	Teeth		Nutrition		All Other Defects	
	Pre-school	Entering School	Pre-school	Entering School	Pre-school	Entering School
1931 . .	159	93	129	23	614	305
1932 . .	273	454	203	421	1,020	982
1933 . .	332	391	366	322	1,374	1,087
1934 . .	391	377	342	283	1,267	1,026
1935 . .	303	483	204	393	1,107	1,013
*1936 . .	1,487	577	1,269	421	8,407	1,687

*1936 figures included Units I and II; also nursery school and Summer Round-Up examinations, increasing numbers examined.

The Well Child Conference figures for the year 1936 are as follows:

Number of Well Child Conferences held during 1936 . . .	81
Number of children examined	3,343
Number of examinations	3,516

(*e*) *Health Survey of Preschool Children:*

Through Federal funds a second Well Child Conference Unit was made available, operating in the same capacity as the original Conference Unit, to demonstrate the need of such service to local communities with the idea of the communities taking over the conference service whenever possible.

In order to ascertain the health of the children during the depression years it was deemed advisable to conduct a health survey of the preschool children who had not formerly been examined at the Well Child Conferences. This survey was confined generally to rural districts in communities under 10,000 population. It was hoped that through this follow-up it would be possible to demonstrate to parents the need of getting children to the family physician for examination, or to urge communities to provide such service for those families unable to afford the service of a private physician.

While in previous years no nursing follow-up of children examined at Well Child Conferences was provided by the Department, it was felt that such service could be given through the increased nursing staff. Consequently, the nursing consultants have carried on nursing follow-up for the children included in the health survey where it was found necessary.

Following requests for Well Child Conferences because of these surveys, the physician on the second unit examined 911 children in 25 towns, these activities covering 50 days' service.

Community organization was stressed in all this work and the aim is to continue until every community is organized for the furtherance of health activities.

(*f*) *Nursery Schools:*

Similar conferences were held for the examination of children attending Nursery Schools conducted under the supervision of the State Department of Education, and carried on locally as Works Progress Administration activities.

In the City of Chicopee, at the request of the local health officer, special service was given the children in Nursery Schools, three visits being made for this purpose during the year, at which 380 examinations were made of the children attending.

Other nursery school conferences were held at which there were 786 children examined in 29 different Nursery Schools in 21 towns.

(*g*) *Summer Round-Up:*

Cooperating with local Parent-Teacher Associations and with other local organizations and nurses, the usual service was afforded in the way of providing printed material and advice for the conduct of this activity locally. Reports were received from 124 communities conducting Summer Round-Up examinations during the year; 8,578 children were examined.

In addition to these the Well Child Conference Unit of the Division carried on Summer Round-Up examinations of preschool children in seven towns, examining a total of 257 children.

3. School Hygiene:

Several interesting projects indicating progress in the field of school hygiene were carried on during the year. Potentially far-reaching were the Millville project, the Sub-committee on School Hygiene of the State Health Commission on Revision of Health Laws, and the inception of an Advisory Committee on School Hygiene.

(*a*) *Millville:*

The first year of a new enterprise is always productive of more spectacular results than any succeeding years. This is especially true of a long time health project such as the school health program in Millville. All the easily corrected defects and readily instituted reforms are attended to in the first burst of effort and enthusiasm. Then comes the long, slow grind of the following years when the residual tasks, seemingly impossible of accomplishment, must be slowly brought to fulfillment.

The drop in the number of defective children from 91% to 56% during the first year of organized school health work is a truly spectacular result, which we cannot expect to repeat. However, it is disappointing to find the percentage of children (first grade excluded) rising four points to 60% rather than falling further. A study of the following table shows that the increase is due to an increased number of dental defects.

	Jan. 1935	Dec. 1935	1936
Children defective	91%	56%	60%
Defects of nutrition	28%	16%	11%
Defects of posture	18%	6%	.03%
Defects of teeth	84%	27%	45%
Defects of throat	24%	14%	12%
Defects of nose	9%	4%	.06%

There was no dental clinic held this Fall; therefore, the connection is too obvious to need comment.

Decrease in other defects is satisfactory. It is particularly gratifying to find a continued decrease in defects of nutrition. Much of the credit of this is due to the interest aroused by the nutritionist whose services were made available again during the summer months. The teachers also devoted considerable time to arousing interest in proper food selection in their health instruction. The hot lunch is undoubtedly another factor in the improvement of nutrition.

Results of Examinations—1936

Number examined	366
Number defective	236
Number of major defects	373
Number of major defects corrected	53
Number of major defects improved or treated	44
Number of irremediable defects	20
*Number of new defects	114
Number of minor defects	247
Number of minor defects corrected	55

*Eyes and ears, defects recorded for first time this year; also increase in dental defects. Includes also defects of children entering for first time.

(*b*) *Sub-Committee on School Hygiene:*

The policies recommended by the Sub-committee on School Hygiene while differing little from those outlined in the School Hygiene Handbook of the Department, expanded and clarified some of the points included therein. Under the suggestion of this sub-committee the State Department of Education issued a revised physical record card for school children, containing as new features the designation—"General Appearance of Health" in place of "Nutrition", and the omission of the term "Standard Weight", substituting therefor the phrase "Standards of Examination for the Benefit of School Physicians".

With the new "Notice of Defect" form two other forms are provided, one for parents to sign indicating their intentions concerning the care of defects found, and one for the family physician to sign after he has seen the child.

(*c*) *Advisory Committee on School Hygiene:*

The Advisory Committee on School Hygiene is the culmination of the hopes of a number of years. It is in line with the State policy of forming advisory committees for various fields of endeavor. This committee is composed of two superintendents of schools, two school physicians, two dentists, two school nurses, a nutritionist, three State officials, and the Commissioner of Public Health who serves as Chairman of the Committee. A balance has been kept between representatives from the larger and the smaller communities in the appointments to membership on this committee. This Committee held two meetings during the year.

(*d*) *Study of Eighth Grade Children:*

A study of the physical record cards of eighth grade children was begun during the year, the purpose of which was to learn how efficiently follow-up of health examinations is carried on as shown by correction of defects over a period of years; what defects tend to increase or decrease as the child progresses through the grades; in what type of community corrections of defects are best carried out, and certain other pertinent facts. Twenty-five thousand records were requested from the superintendents of schools and the Division received excellent cooperation in this project. Of the 22,720 records received 13,741 will be studied in detail. Of those asked to participate in this study 123 communities responded. Thus far only the recording of certain facts has been possible.

(*e*) *Test of Health Consciousness:*

This test was formerly called the Health Awareness Test for high schools, but to avoid confusion with tests used elsewhere and similarly named, it was decided to call it the Test of Health Consciousness. The demand for copies of the test has continued. Thus far 12 requests for copies have been filled. The Harvard School of Education has used the test in a survey in New York and standardization is still going forward.

(*f*) *School Hygiene Surveys:*

School hygiene surveys were made in two communities during the year—Amherst and Webster—and recommendations sent to the local superintendents of schools.

(*g*) *"Contact":*

This pamphlet, issued for school health workers, continues to be received enthusiastically. During the year every specialty having to do with school health work was allotted a column in each issue of "Contact" for special messages in that particular field.

(*h*) *School Physicians:*

Attempts were made again to reach school physicians with a view to organizing for the discussion of mutual problems. Two meetings were held, one for northern Worcester County and one in West Boylston. Though the attendance at both meetings was small, the discussion was lively and a number of problems were settled to the satisfaction of those concerned. During the year 20 school physicians were visited, representing 31 towns.

(*i*) *Audiometer Tests for Hearing:*

The use of an audiometer in the schools for the testing of hearing of school children was made possible through the purchase of audiometers by the Division. It was planned to offer this service chiefly to rural sections of the State and to places where it was not possible to secure this service otherwise. The work is done by a physician or the consultant nurses connected with the Division of Child Hygiene. Assistance in correcting the tests has been freely given by the teachers and nurses locally. The demand for the service so increased that it was necessary to purchase a second audiometer.

This activity is described more in detail in a later section of this report.

4. Public Health Nursing:

Many changes were made in the general nursing program of the Division because of the expansion of work incident to the new program under the Social Security Act grants of funds. The nursing staff was increased to seventeen in number, twelve of whom were assigned to definite districts within the State as public health nursing consultants. The nursing districts were reduced in size but the program for all the nursing consultants was continued on a generalized nursing basis so as to include supervision and consultation for all types of nursing service. The consultant nursing service is now almost entirely on a county basis; one nurse is assigned to each of the following counties: Berkshire, Franklin, Hampshire, Hampden, Plymouth, Essex and Bristol; one covers Norfolk County and the City of Boston in Suffolk County; two cover Worcester County, one in Northern Worcester section and one in Southern Worcester section of the county; one is assigned to Middlesex County and the remaining communities in Suffolk County; and another is assigned to the towns in the Nashoba Health District, as well as Barnstable and Dukes Counties. New appointments in the nursing field included also a Consultant in Public Health Nursing Education; a Consultant assigned to the work for the nursing field in the care of the premature infant; one assigned to the New England States Teaching Center located at Harvard School of Public Health; and a field nurse assigned to the second unit for Well Child Conferences.

The Chief Consultant in Public Health Nursing spent a great deal of time in giving consultant service to nurses, visiting nursing organizations, Works Progress Administration officials, Red Cross representatives, insurance companies' representatives in the nursing field, as well as other nurse employing agencies, concerning program planning and other nursing matters.

Much of her time was spent in instruction of newly-appointed staff nurses in the new work assigned to them and in outlining the particular program of other staff activities in correlation with the nursing program.

She also offered vocational guidance to nurses desiring information relative to opportunities in the public health nursing field; to personal educational needs of nurses; and to recent graduate nurses desiring to enter the field of public health nursing.

A great deal of her time was devoted to plans for the development of teaching fields for public health nursing students, requiring numerous conferences and meetings with representatives of the Children's Bureau, the United States Public Health Service, and those concerned in the local communities under consideration for this purpose.

The Chief Consultant in Public Health Nursing served on one of the committees of the State Health Commission appointed to study the health laws and practices of the Commonwealth, requiring attendance at fifteen conferences with regard to public health nursing.

The Consultant in Public Health Nursing Education was assigned to study and observe the various health centers in the eastern section of the State chiefly for the purpose of finding out where satisfactory health teaching programs were being carried on by physicians and nurses, having in mind the selection of suitable places to serve as observation centers for students in public health nursing. The general findings were that health teaching by nurses in the majority of cases was inadequate. In the few places where health teaching was carried on satisfactorily, the possibilities for student education were poor, because of lack of space, insufficient personnel, etc.

Considerable time was spent conferring with nursing representatives of the Children's Bureau and the Simmons College School of Nursing for the discussion of general plans for nurses selected for scholarships under Social Security funds. Included also was a group meeting of the various executives of the agencies with which Simmons College has affiliation for the field experience of public health nursing students, for the discussion of future plans.

The Consultant in Nursing Education held a conference in Springfield with representatives of Springfield College and a group of others interested in public health nursing education from the western section of the State, to discuss the need for extra-mural courses carrying college credit. As a result of this conference a course in Child Psychology was given in Pittsfield in the Fall by a member of the Springfield College staff.

Six weeks of her time were spent in the Berkshire Health District substituting for the Director of Nursing, during her absence on scholarship at Columbia University.

Because of the revised nursing program the Consultant Nurses spent considerable time in community organization in their newly-assigned districts, placing particular stress upon prenatal nursing service, adequate maternity service, organization for Well Child Conference service and health surveys of the preschool children, follow-up of nursery school children, and the care of the premature infant. In communities where Well Child Conferences were held each Consultant Nurse served as a member of the Unit conducting the conference and assisted materially in the preliminary organization for such conferences. In communities where no nursing service is available the Consultant Nurses did home visiting upon children examined at Well Child Conferences. During the year 1936, the nursing staff of the Division made 1,638 such home visits.

The work on parents' conferences was continued in several of the districts and the stimulation of Mothers' Classes was carried on in the local communities.

(*a*) *School Nursing:*

In the study of eighth-grade physical record cards, the Consultant Nurses assisted in securing the information desired in some instances and in conferring with school superintendents and school nurses with regard to this study.

Valuable assistance was rendered by the Nursing Consultants in plans and programs of local communities for adequate school nursing service; in the establishment of dental clinics for school children; in the work with the audiometer testing of school children; in the matter of keeping adequate school nursing records and assisting newly-appointed nurses in their school nursing program; and also in the conduct of school nursing surveys.

(*b*) *Tuberculosis Nursing:*

Considerable time was spent in reviewing tuberculosis cases in local communities with the local nurses. From all districts there is noted decided improvement in the nursing follow-up of tuberculosis patients and better record-keeping is evident.

This service has stimulated local boards of health and public health nurses in case-finding, reporting and follow-up. It has also led to an increase in Chadwick Clinic consents in several sections of the State; more contacts are being reached for examination and some positive cases found among unsuspecting persons.

(*c*) *Communicable Disease Nursing:*

Particular attention was focused on the matter of arranging programs of immunization against diphtheria, in cooperation with the State District Health Officers and the local health authorities. In the Franklin County District the Nursing Consultant attended the scarlet fever toxoid clinics held in Greenfield, which have been conducted for two years in that section of the State. In Berkshire County district about 60% of the school population has been immunized against diphtheria and among the preschool children of the County there have been immunized in some communities 20% to 100% of that age group.

This year the Institutes for Nurses were on the subject of "Communicable Diseases". The Consultant Nurses attended these Institutes, as did other staff members, and a great deal of benefit was derived from them generally.

(*d*) *Hospital Training Schools:*

One Consultant Nurse gave a series of six lectures to fifteen student nurses at Rutland State Sanatorium for Tuberculosis; a series of three lectures to twenty-two students at Burbank Hospital in Fitchburg; and a series of four lectures to eleven students at Westborough State Hospital.

In Franklin County District the Consultant Nurse gave three lectures in the course planned for the student nurses at Cooley Dickinson Hospital in Northampton, and three in the course at the Greenfield Hospital.

In Hampden County the Consultant Nurse gave one lecture to the intermediate students at Wesson Memorial Hospital in Springfield, on "Preventive and Educational Measures—Follow-up and After-care".

(*e*) *Continuation Classes:*

During the early part of the year Continuation Classes were conducted on the subject of "Sociological Approach to Public Health Nursing", in Holyoke, Lynn, Quincy and Worcester, reaching 156 nurses.

A series of fifteen classes on the same subject was planned for the nurses of the City of Boston Health Department, reaching 150 nurses. At the close of the year five of these classes had been completed.

This particular type of teaching service will be discontinued when the Boston series is completed.

(*f*) *Institutes for Public Health Nurses:*

This year the Institutes for Public Health Nurses, conducted in cooperation with the Commonwealth Fund, were devoted to the subject "Communicable Diseases". A series of eight two-day Institutes were held in Pittsfield, Northampton, Fitchburg, Worcester, Harwichport, Bridgewater, Salem and Weston. All agencies employing nurses were contacted regarding these Institutes and urged to release their nurses so that they might take advantage of them. Excellent response was received from these agencies and unusual interest was displayed on the part of the nurses attending the various Institutes. Much benefit was derived from the discussion periods following the talks, the nurses responding generously to this and receiving many helpful suggestions for the solution of some of their problems.

The total attendance at all Institutes was 517, representing 177 cities and towns of the State, as compared with 209 nurses attending the Institutes in 1935.

Several of the Consultant Nurses attended Tuberculosis Institutes during the year.

(*g*) *Health Clubs:*

These health clubs formed by public health nurses continue to meet a decided need for opportunity for discussion of mutual problems and plans. The Consultant Nurses of the Division assisted in planning of programs annually, in the selection of suitable speakers for the meetings of the clubs, and in planning field

visits to such institutions as the State Hospitals for mental diseases, tuberculosis and cancer hospitals, and special schools for the deaf and the blind. Evening meetings were planned on several occasions in order to include the industrial nurses unable to attend daytime meetings.

(*h*) *School Lunch Program:*

In several instances the Consultant Nurses assisted the nutritionist in the preliminary plans for the school lunch program and surveys, and school lunch managers were urged to attend the School Lunch Institute held at Fitchburg State Teachers' College during the summer.

(*i*) *Crippled Child Program:*

Cooperating with the Division of Administration of the Department, the Consultant Nurses assisted in a survey of crippled children in the State, contacting local nurses in each community and securing their cooperation in reporting to the Department known cases of crippled children. One of the Consultant Nurses attended a clinic for crippled children in Greenfield. Through funds available for this program two consultants were privileged to take courses in physiotherapy at Harvard Medical School.

(*j*) *Scholarships for Nurses:*

Scholarships afforded by the Commonwealth Fund were made available, to four nurses in the State, at East Harlem Nursing and Health Center in New York.

Through Social Security funds, granted through the United States Public Health Service, additional scholarships were granted to nurses in Massachusetts, to be given at Simmons College School of Public Health Nursing, for four months. At the close of the year, eight nurses had been given these scholarships. The employing agencies where these nurses were employed cooperated generously in permitting their nurses to take advantage of this refresher work in public health nursing. In addition, one of the Consultant Nurses was given a six-weeks refresher course at Columbia University.

(*k*) *Premature Infant Nursing Program:*

The program for the care of the premature infant included the services of a Consultant in Public Health Nursing whose chief activities were devoted to lectures and demonstrations on "Nursing Care of the Premature Infant"; also the selection of suitable equipment required to carry out the nursing program in this field of activity.

Cooperating with the Premature Program Sub-committee of the State Advisory Committee on Maternal and Child Hygiene, lectures were prepared for hospital graduate nurses and for private duty and public health nurses, on the proper nursing care of the premature infant.

(*l*) *New England States Teaching Center:*

One Consultant Nurse was assigned to work with the New England States Teaching Center established at Harvard School of Public Health, through Social Security funds. Much of this nurse's time was spent in organization of teaching material; in organization and use of the premature baby clinic for teaching purposes; in demonstration of nursing visits with mothers in the clinic, for observation purposes of students from the Harvard School of Public Health; in supervisory home visits to babies after their return to the home from the hospital, and correlated work in this field.

(*m*) *General Nursing Service:*

In addition to the foregoing activities the Nursing Consultants gave consultant service and advice to Parent-Teacher Associations, Visiting Nursing Associations, County Public Health Associations, Community Health Committees, boards of health, town managers, and other health, social and lay organization groups.

All the Consultant Nurses were actively engaged in program and meetings of the Massachusetts Organization for Public Health Nursing in its annual meeting and in local section programs. They cooperated also in the programs of the State

Nurses' Association, State Industrial Nurses' Association and State League for Nursing Education.

During the Spring floods their services were available and freely called upon in the districts so afflicted.

5. Nutrition:

(*a*) *Nutrition Advisory Committee:*

The Nutrition Advisory Committee met in the Fall for the discussion of nutrition problems and gave helpful advice on how to get financial support, as well as interest, of counties and communities for the employment of a nutritionist. The Chairman of the Child Welfare Division of the State Federation of Women's Clubs was appointed as a member of this Advisory Committee by the Commissioner of Public Health, as a lay member; the Massachusetts Organization for Public Health Nursing was represented on the Committee by its president.

(*b*) *Massachusetts Health Commission:*

There was no nutrition section appointed as a sub-committee of the State Health Commission but the Consultant in Nutrition served as a member of the Sub-committee on School Hygiene, for the discussion of nutrition standards and recommendations for the school child. In this connection Professor Hilliard of Simmons College wrote a concise and clear report of the need for and the work of the nutritionist, with suggestions for her employment, to be presented to the Commission.

(*c*) *School Lunch:*

One of the nutritionists devoted most of her time during the year to the continuance of the School Lunch Survey and improvement and offered necessary assistance in matters of food selection, buying, equipment, cost accounting, and organization of kitchen and food orders. Through this particular service 57 communities were reached. Many conferences were held with school lunch committees and managers and talks were given to local organizations interested in securing adequate school lunch service for the children. Meetings of school superintendents, teachers and nurses were held also and talks on the school lunch were given in classrooms on occasions. Recommendations were made that more fruit and vegetables be included in the lunches served; that more dark bread be used in the sandwiches; that a hot dish be prepared to supplement the food brought from home by the children in country schools; that more milk be served in place of tonic. Exhibits were displayed in some schools showing an "A" grade luncheon as compared with a poorly selected luncheon, to stimulate interest in proper food selection. In several instances it was noticed that there was improvement in the food habits of the students and also that cafeteria receipts had increased in some communities.

The chairman of the Child Welfare Division of the State Federation of Women's Clubs interested her group in continuing cooperation with the Division of Child Hygiene for the benefit of school lunches, and local clubs were asked to request the services of a nutritionist to assist in their plans.

A summer course in Nutrition was given at Fitchburg State Teachers' College for school lunchroom managers in small schools, as well as for those in the larger schools. Forty-five school lunch managers attended these courses, almost doubling the attendance of the previous year. Similar courses were given also to vocational school home economics teachers, 20 attending from this group. Two nutritionists of the Division assisted in giving these courses in cooperation with the State Department of Education.

(*d*) *Well Child Conferences:*

At the Well Child Conferences conducted by the Division of Child Hygiene a nutritionist was in attendance as a member of the Unit staff, and gave advice and assistance to parents relative to proper food selection, budgeting the food money, and food habits of their children.

When the program was developed under Social Security funds a second Well Child Conference Unit was established which included the services of a nutritionist. This greatly augmented the assistance available to local communities in nutrition

advice for Well Child Conferences, for Nursery Schools, and in the conduct of the health survey of the preschool child. The nutritionist on this second unit interviewed each of the 1,303 mothers concerning the nutrition of their children, basing suggestions for betterment upon the findings of the physician, nurse and dentist of the unit who had talked with these mothers previously. For the Nursery Schools under the supervision of the State Department of Education such conference service was given when desired.

A summary of the nutrition findings at the Well Child Conferences for both Units 1 and 2 during the year is as follows:

Number of children seen by nutritionists	3,506	
Number of families represented	2,679	
Number children showing good nutrition	1,792	51%
Number showing slight defect	1,169	33%
Number showing moderate defect	414	12%
Number needing immediate attention	131	4%
Number needing more milk	828	24%
Number needing more fruit	1,186	34%
Number needing more vegetables	1,456	42%
Number mothers needing budget advice	614	18%
Number needing whole grains	1,497	43%

(*e*) *Dental-Nutrition Service:*

In Provincetown at the time of the first follow-up visit there were 53 children enrolled on the dental-nutrition register. In spite of poor economic conditions many families showed considerable improvement in health habits and food selection. Definite nutrition assistance was given to a committee interested in establishing a summer health camp for Provincetown children.

At the three State sanatoria admitting children, menus were supervised from April to October. This work was carried on in coopreation with the Forsyth Dental Infirmary. A study of the records of the past few years is now in progress and when figures are available they will be used as a basis for future work in this field.

In Reading the first follow-up visits were made by the nutritionist in the Spring of 1936. It was noted that families definitely tried to increase the amounts of fruits and vegetables in the diet, many learned to use new foods, and the eating habits generally were much improved.

In Harwich a study was carried on in cooperation with the Visiting Nurse Association, the school department and interested members of the Women's Club. Twenty families were visited to discuss particular food and tooth problems in connection with 48 children who were reported to have decided dental defects. Talks were given in every grade in the schools on "Three Meals a Day" and visits were made to the nursery school to assist in menu planning for the children attending. From the information obtained it was found that with the lack of milk, fruits, raw vegetables and dark breads, poor dental conditions would be evident.

(*f*) *Community Nutrition Service:*

Following the suggestion of a nutritionist of the Division, Wellesley college students for the second year employed a nutritionist for the three summer months, as their contribution to the Town of Millville. This proved to be of benefit to both parents and children.

In Lynn the Health Department was granted the services of a nutritionist appointed through Works Progress Administration funds, the Nutrition Consultant of this Division working with the nutritionist there on organization of the service, case reporting and other matters.

The Visiting Nurse Association of Milton appointed a nutritionist for one day each week, for the consideration of special cases recommended by the nurse; she also conducted a low-cost food class.

In Worcester nutrition service under Works Progress Administration opened up the service to the city. This was followed by the appointment of two nutritionists by the City Department of Public Welfare and four by the Health Department of Worcester.

In all of these services the nutritionists of this Division gave assistance. In several communities we have given cooperation to local welfare agencies through the social workers of the Department on a technique for budget assistance. One of the Division nutritionists did home visiting on this program.

One nutritionist gave service to the City of Chicopee since early in the year. Two days each month were devoted to this community because of a special need. Improvement was evident in the food habits of many families and the high school students were especially interested in proper food selection following the nutrition classes which were held weekly for their benefit. Lesson plans in nutrition were provided for these classes through the joint cooperation of the Coordinator in Health Education, the Nutrition Consultant and the nutritionist assigned to give service in Chicopee.

In Pittsfield five weeks were given to the community nutrition demonstration there. Through a local nutrition advisory committee, interest in the employment of a local nutritionist was initiated and while this was not accomplished during the year it is one of the hopes for the future in this city.

A nutritionist was assigned to carry on a community nutrition demonstration in the Berkshire Health District late in the preceding year when it was planned that two weeks service be given that district over a period of six months. Official health, welfare, educational and social organizations were contacted, as were also the other organizations in the communities, to secure active interest in the nutrition program. This required numerous conferences, meetings, lectures, exhibits, discussions of budgets and relief measures, and the preparation of newspaper publicity material to bring about nutrition consciousness on the part of individuals and groups. School lunch surveys were made, budget classes held, home visits made upon special cases, mothers were contacted at Well Child Conferences, physicians, nurses, dentists and dental hygienists were contacted, to secure complete cooperation in the nutrition demonstration. School lunch problems seemed to be outstanding and in many communities appeared to be the most obvious nutrition problem. However, work along this line proved to be not only a means of correct child feeding but also an excellent medium for health education.

Late in the year similar service was begun in Barnstable County. In this district the nutritionist contacted 64 key people in the interest of the nutrition demonstration, gave talks before official and lay groups reaching nearly 200 people; gave nutrition consultation and advice for 142 children and 93 parents at 4 Well Child Conferences. The time spent there was so brief that little could be accomplished other than to make first contacts and survey the field with regard to the nutrition needs.

Nutrition service was given also in Amherst, Belchertown, Chester, Hanson, Hubbardston, Lowell, Medford, Newton, Princeton, Sterling, Weston, Winchendon, Worcester and the Islands of Martha's Vineyard and Nantucket.

Likewise demonstration work was begun late in the year in Southern Worcester County and definite service given in Grafton, North Grafton, Spencer, Upton, Uxbridge, Millville, Blackstone, Leicester, Southbridge and Webster.

In Westborough a parent-teacher-student activity was initiated following the request of the superintendent of schools for assistance in establishing better food habits for the school children by means of a better home-and-school program. A conference was held with the Coordinator of Health Education and the nutritionists concerned regarding a questionnaire for the school children concerning their food practices. In the first four grades the children were assisted by their parents in filling out this questionnaire covering three days' food consumption at meal time and between meals, and from the fifth through the twelfth grades the children themselves filled out the questionnaires covering a one-day period. These records are now being studied and upon the findings will be based plans for future nutrition activity in this community. Excellent cooperation was received from all groups concerned and the interest of the parents was sufficiently aroused for them to request round-table discussions of food problems.

(*g*) *Summer Camps:*

The newly-appointed Director of the Massachusetts Tuberculosis League afforded an opportunity for the Consultant in Nutrition to start off the summer

camp work by leading a nutrition round-table discussion for camp directors and staff members at Prendergast Preventorium in May before the opening of the summer camps. Eighteen camps requested nutrition service from one to three days, two visits being made to three of these camps. A total of 1,184 children were resident at these camps and it was noted that the children's health practices had improved following the nutrition service thus given.

As a result of the camp visits this year the general recommendations for all camps were: that a seminar for all counselors be held before the camps open, which would include discussions by a successful camp director, a nutritionist and a psychiatrist; that either home economics students or dietitians be employed only if they have had experience in quantity cookery; that each camp have on its staff an experienced dietitian; that better follow-up work be done with children and parents during the rest of the year in order to make camp life a more lasting experience; that since certain corrections in camp life cannot be made by the camp directors alone, some plan might be devised to have the nutritionists' suggestions referred back to the boards of directors of the camps.

(*h*) *Chadwick Clinics:*

Since a nutritionist was assigned to Barnstable County to participate in all nutrition activities carried on there, nutrition consultant service was given at the Chadwick Clinics held in Bourne, Brewster, Chatham, Dennis, Hyannis, Provincetown, Wellfleet and Yarmouth.

(*i*) *Home Visiting:*

To meet the request of the social workers of the Department for nutrition home visiting where there was a definite need for such follow-up, this service was initiated and carried on during the year. Such home visiting was made available to local nurses and social workers also, when requested. The following towns were given such service during the year: Chelsea, Greenfield, Chicopee, Malden, Pittsfield, Weymouth and Turners Falls (Montague). In Turners Falls the request came from the social worker and officials of the Society for Prevention of Cruelty to Children.

(*j*) *Nutrition Education:*

Much time was devoted to this phase of nutrition service to lay and professional workers throughout the year.

At Fitchburg State Teachers' College, in cooperation with the State Department of Education, a one-week course in Nutrition was given by two of the staff nutritionists for a group of 45 school lunch managers. In addition to this course, nutrition instruction was given in individual communities to school lunch managers.

At the same Teachers' College also one of the staff nutritionists gave courses in Nutrition to 25 teachers of household arts and to industrial and continuation school teachers. Two one-week courses were given to this group on the subjects: "New Developments in Nutrition" and "Methods of Teaching Nutrition."

The same material was presented to 20 evening school and general vocational school teachers in another series of classes.

In Lynn and Quincy budget classes were held for nurses.

During the year much time was given to professional workers who were anxious to obtain information on nutrition, and advice on their particular nutrition problems. Students from the Rockefeller Foundation visited the Division of Child Hygiene for such service. Among these was a former research chemist from Belgium who has interested also the physicians of Belgium, and who is to be the first nutritionist appointed in that country. A dietitian from Scotland sought nutrition advice, as did the first public health nurse in Spain, whose headquarters are at Madrid, and who reported great need of nutrition service in Spain.

Physicians from the Harvard School of Public Health, attending Dr. Diez's seminar on "Work of the Nutritionists in Public Health", appeared for individual conferences with the nutritionists of the Division. One from the Province of Quebec plans to employ a nutritionist as a result of his conference, and the needs.

Senior students in social dietetics from both Simmons College and Regis College were reached with this service.

(*k*) *Works Progress Administration:*

Consultant service on foods and nutrition, particularly with regard to the nursery schools, was given freely in communities where Works Progress Administration projects were being carried on. This included suggestions for meal-planning, cooking and serving of lunches, equipment and budget advice.

In Lynn the Works Progress Administration project placed a nutritionist under the supervision of the Health Department. The Consultant in Nutrition of the Department worked with this nutritionist and the local public health nurses, assisting in organizing the nutrition service to be given that city. Case reports of the work accomplished under this project were excellent and it is hoped that the service may be continued.

In Worcester the Works Progress Administration paved the way for the appointment of nutritionists locally by the City Department of Public Welfare and by the City Department of Health. Of those formerly employed under the projects two were taken over by the local Welfare Department and four by the Health Department to continue nutrition service for the city.

In Boston, through a Works Progress Administration Art Project, it was possible to have a series of posters made for the field use of the nutrition staff at the Well Child Conferences and exhibits of the Division. These met an urgent need and were used freely throughout the State.

(*l*) *The Spring Floods:*

Nutrition service was given in the areas affected by the Spring floods. A detailed report of this special activity is given in another section of the Division report.

6. Dental Hygiene:

During the year the dental program of the Division was somewhat changed and expanded. Through the Social Security funds a physician, who is also a registered dentist in Massachusetts, was appointed to the staff. Two public health dental hygienists were appointed, one to fill the vacancy caused by the resignation of a former appointee, and an additional one under Social Security funds.

The physician-dentist conferred with the Coordinator in Health Education, much time being devoted to studying the trend and needs of present-day health education, and material was developed for use in schools, such as dental hygiene teaching units and dental facts for teachers themselves.

(*a*) *Dental Certificate Program:*

The dental certificate program was carried on, as usual, and reports were received from 214 cities and towns carrying on this work. At the time of the school dental examinations 20,753 children received dental certificates from the school dentist; those receiving dental certificates from clinic dentists at the completion of their dental work during the year numbered 46,095; and 34,181 children received dental certificates from their family dentists when their dental work was completed. In one town where it was reported that 100% received dental certificates, the dentist, upon request, gave a special talk to the children and their parents.

(*b*) *Dental Clinics:*

Annual reports of local dental clinics and traveling dental clinics were received from 149 cities and towns. Following are statistics of dental clinic service during the year:

	Local Clinics	*Traveling Clinics*
Children receiving dental care	63,490	2,156
Children with work completed	26,744	875
Cleanings done	44,905	1,265
Fillings done	72,072	6,139
Teeth extracted	46,158	1,549

(*c*) *Preschool Program:*

At the State Demonstration Well Child Conferences dental inspections were made in 50 towns, and similar dental inspections were made of children attending

Nursery Schools in 5 towns. In all there were 1,940 children thus inspected, of which number 637 were found to be without dental caries. At these conferences specific instruction in dental care was given the parents and guardians of the children attending.

(*d*) *General:*

The staff dentist conferred with the District Dental Societies of the State and at the close of the year had spoken to all but one of these at their regular meetings; at one such meeting giving a demonstration of the procedure followed in the dental service given at the Well Child Conferences conducted by the Division of Child Hygiene, with respect to dental inspections and mouth examinations.

Lectures on "Public Health Dental Hygiene" and allied subjects were given at Harvard Dental School; at the New England Hospital for Women and Children, to the internes; at Boston University, to medical students and also to a class of teachers there; and at Harvard School of Public Health, to students there. Boards of Health, Parent-Teacher Associations, School Committees, and Mothers' Groups were reached with special talks on dental hygiene.

In conjunction with Forsyth Dental Infirmary the dental exhibit of the Department was displayed at the annual Convention of the Massachusetts Dental Society.

The dentist gave considerable time to the State Health Commission through attendance at meetings and the preparation of special material for this purpose.

Physicians and dentists from 12 different states have conferred with the staff dentist relative to the dental program and all have been enthusiastic in their praise of our plan. A dental surgeon from the United States Public Health Service was assigned to the Department for the winter months for field experience and observation because ours is considered to be a progressive State in this field.

As in the past, we continued this year our plan of sending educational material to the dentists in the State and all were supplied with a copy of the Dental Hygiene number of *The Commonhealth*, the quarterly bulletin of the Department.

7. Parent Education:

In the early Fall a Consultant in Parent Education was appointed under the Social Security Program. A survey was made of the general needs which might be met in this field, and particular service was given at some of the Well Child Conferences conducted by the Division in the matter of consultant service to the parents attending.

Posters were made, book lists prepared on child development and rearing, and other material is in process of preparation for distribution at the Well Child Conferences for the guidance of parents. Programs for study groups of mothers were also initiated.

Observation field visits were made to other states where such activities are in progress and valuable information secured through this interchange of ideas and discussion.

Field visits were made also with the Consultant Nurses in the interest of parent education to find out the specific needs within their districts.

Special classes in parent education were held by the Consultant in Parent Education for the staff of the Division of Child Hygiene, at which definite problems were discussed.

The Consultant in Parent Education gave 28 lectures on the subject to various groups throughout the State. A series of four lectures was given in Chicopee, at the request of the Parent-Teacher Association, and in cooperation with the local official agencies.

Individual consultation was given to parents directly concerned with problems of rearing their children and to others wishing to help in programs for special groups interested in parent education. Parents were directed to the proper authorities from which to secure further help, when necessary. Assistance was given to the Works Progress Administration in the matter of providing an Adult Education Project and advice given with regard to the possibility of training for the underprivileged parent. In Worcester special assistance was given a group interested in plans for a community center for parent education and family informational purposes. The Consultant in Parent Education conferred also with the State

Commissioner of Education concerning the establishment of a Latin-American Educational Center for students from South America, to meet an evident need. Service was given also to the Director of Neighborhood Councils concerning a program of parent education for parents of predelinquents and delinquent juveniles.

The most important project in this field was the planning of a course of instruction for lay leaders in parent education which will be started early in the coming year. These leaders, following the course, will be expected to carry on parent education in their own communities and Institutes will be planned for their future guidance and instruction. For the purpose of selecting suitable candidates for this activity personal interviews were held in every instance and at the close of the year twenty-six applicants were registered to take the course. Suggestions for possible candidates, and first contacts, were made in most instances by the Consultant Nurses of the districts. The plan includes a one-week intensive training in parent education, for three successive years, taking up in turn the young child, the school child and the adolescent.

8. Research Learning Project:

Another special project was launched this year through the Social Security Program in the field of Research Learning, with particular reference to learning handicaps because of vision difficulties. The staff for this project includes a physician who is also an ophthalmologist, an educational psychologist who will direct the project, and an assistant trained in elementary education and psychology. The project will be carried on in first and second grades and as far back in the preschool age as is possible. The program was planned in the belief that the present widespread failure in the first grade is, for the most part, preventable. Present conditions, under which a high percentage of young children enter the first grade, only to fail and repeat the grade the second year, is lamentable from every standpoint. Early frustration and the sense of inferiority which attend such failures lead to personality disorders and maladjustment, and otherwise constitute a check definite to normal development. In addition, there is the vast waste to the schools.

With these facts in mind, a complete plan was laid down for testing the eye and ear functions of young children. A survey of the needs was made in selected sections of the State, and upon special request of the local school officials. Demonstration testing was begun in the Town of East Longmeadow, with most enlightening results and further work is being carried on at present. Consultation service was given teachers and nurses and a series of four lectures given the same groups. Numerous conferences were held with school superintendents, school principals, teachers, physicians, nurses, parents, and members of research divisions of various optical companies concerning required equipment and plans for conducting the project. At the close of the year 44 children had been tested and studied and 4 children were given individual instruction and demonstration.

9. New England States Teaching Center:

Through federal grants from the Children's Bureau and the United States Public Health Service a teaching center for the New England States was established at the Harvard School of Public Health. Through this teaching center pediatric, obstetric and dental consultant service are available, and there is also included on the staff a public health nursing consultant and a public health nutritionist assigned by the Division of Child Hygiene.

Special courses in child health services were planned by the Department of Public Health and the Harvard School of Public Health. The course entitled "Program A" consisted of eight courses for four weeks each, each course being followed by a second course entitled "Program B" covering four weeks.

Program A included the following activities: Morning rounds at Boston Lying-In Hospital, Children's Hospital or Infants' Hospital, to observe primarily conditions in infancy and early childhood which resulted from improper preventive care. These visits included the premature nursery, well baby clinics, habit clinics in Boston, dental program at Boston Dispensary, orthopedic clinics, infantile paralysis clinics, posture training and scoliosis clinics. Special programs were arranged at the Study Center which included lectures on prenatal and maternal care as it

relates to the protection of both mother and infant, including nursing and nutrition as well as obstetric care. There were included also special work in nursing health services; social service; record keeping; mental development and behavior; mental testing; posture and body mechanics, including the examination of infants and children at the study center; pathological conferences and special work in dental care and nutrition.

Program B included much of what was contained in Program A and also field trips to Health Units; Community Health Associations; Well Child Conferences conducted by the Division of Child Hygiene and local conferences as well; the observation of school child activities; Mothers' Club activities; and actual home visiting. All students were given definite descriptions of the activities of the Division of Child Hygiene through personal conferences with the Director and other staff members. At these conferences printed matter and bulletins of the Department were distributed. Special work was offered in the toxemia clinic at Boston Lying-In Hospital; also at contagious hospitals.

These courses were arranged to give training in the content and practical application of maternal and child health services to physicians and public health officers who wished to direct or participate in public health activities in this field. No opportunity was offered for the study of pediatrics as it applied to the sick child. One essential was that applicants have had some experience with children and an adequate background in medicine as it applies to the child. Program A stressed particularly the fundamental elements of care required whereas Program B devoted more attention to the methods and organization of services giving this care.

Physicians taking these courses were not regularly enrolled as students in the Harvard School of Public Health and received no official recognition from Harvard University. A letter from the Department of Child Hygiene of the Harvard School of Public Health, indicating the type of experience which had been offered, was provided those whose attendance and participation had been satisfactory.

Residents of Maine, New Hampshire, Vermont, Massachusetts and Rhode Island were given priority for enrollment. Applications by letter were required, giving an outline of medical training and indicating the amount and type of experience with children the applicant possessed.

(*a*) *Nursing Service for Premature Infant Program:*

A public health nursing consultant was assigned to the New England States Teaching Center late in September. From the time of her appointment until the end of the year her activities were concerned chiefly with the establishment of nursing service in the Premature Baby Clinic and teaching service to students from the Harvard School of Public Health and students from Harvard Medical School.

The organization of nursing service was effected through the cooperation of the social worker of Boston Lying-In Hospital, the physician in charge of the premature baby clinic, and the clinic staff. Nursing visits were made both at the clinic and in the homes. Visits were made to the homes before the baby's return from the Lying-In Hospital premature nursery for investigation of the home as to suitability for the baby's future care and for instruction of the mother in preparation for the baby's arrival. Visits were again made immediately after the baby's home-coming, for demonstration of bathing, dressing and feeding, the mother giving a return demonstration the following day when a supervisory visit was made. Thereafter visits were made between clinic visits, until the baby's discharge from the clinic at eighteen months of age. At the close of the year there were enrolled in the clinic 39 infants and 8 preschool children. The total number of home visits made was 140 from September 20, when the work was begun, to December 31, 1936, as follows:

Infants:	visits for investigation of homes	9	
	for demonstration of baby care	6	to 49 patients
	for mothers' return demonstration	6	to 49 patients
	for supervisory visits	104	
Preschoolers:	(over 1 year) supervisory visits	15	—to 11 patients

Students from the Harvard School of Public Health made home visits on occasions and attended weekly round-table conferences of the clinic staff for the discussion of findings in the premature baby clinic; also weekly two-hour conferences with the Consultant Nurse for the discussion of nursing supervision in maternal and child care. Exhibits of baby's clothing and toys were assembled for display at these conferences and printed material on maternal and child health was distributed.

Demonstration home visits were made and talks on infant welfare nursing supervision were given to third-year students at Harvard Medical School, following their observation of a demonstration medical examination of a Well Baby Conference baby. These talks were given weekly by the Consultant Nurse.

(*b*) *Nutrition Service:*

Late in the year a nutritionist was assigned for service at the Child Study Center in connection with the New England States Teaching Center. A conference was held with the medical director of the Center and the nutritionist in charge, as well as the Director of the Division of Child Hygiene and the Nutrition Consultant, and plans formulated for the nutrition program to be carried out at the center. The newly-assigned nutritionist participated in the premature baby study conducted by Dr. Snedeker of the Child Study Center, and the preschool clinic at Whittier Street Health Center in Boston, one of the field stations available to students from the New England States Teaching Center. The nutritionist assigned to the Center also observed the nutrition conferences held by other members of the teaching staff at the Center.

10. Postgraduate Courses for Physicians:

Another activity of the plan under Social Security funds was to provide postgraduate courses for physicians, two courses to be provided, one in obstetrics and one in pediatrics, each course to consist of five lectures and each to be given on a district basis. The service was planned fundamentally for rural communities but it was kept in mind also that physicians from the cities serve the rural districts and might well be included. The matter of offering such courses was taken up with the Committee on Postgraduate Instruction of the Massachusetts Medical Society and the selection of the districts to be included will be acted upon by the Executive Committee of that Society. While considerable time was spent in formulating plans and in the discussion of the content and extent of such courses, none had been arranged up to the end of the year.

So many applications were received for these courses that it will be necessary to plan for additional centers where they can be conducted.

11. Health Education:

This field of activity in the Division of Child Hygiene was expanded during the year through the Social Security Program and included the appointment of a Teacher-Training Coordinator in Health Education. This coordinator spent considerable time in surveying the field to discover present needs in health education for elementary and high schools and in organization for the demonstration of health education programs. Suitable material was prepared for use in carrying on this program, group meetings were held and lectures given on the subject in several communities.

Special work was done in the City of Springfield, in cooperation with the elementary school supervisor, the director and assistant director of the Department of Health and Physical Education, and a group of teachers working on a curriculum plan in health education. A talk was given before fifteen teachers working on health education courses for the intermediate grades.

In Worcester County during the Fall a series of four lectures was given in Leicester before a group of thirty-five teachers; in Spencer, three lectures, before twenty-five teachers; and in Webster one lecture before sixty teachers.

Intensive field service was rendered in Bristol, Franklin and Plymouth Counties also, as well as in the City of Chicopee.

In all plans and contacts with the schools the Coordinator of Health Education worked in close cooperation with the State Department of Education, especially

with Supervisors of Secondary and Elementary Education and the Supervisor of Physical Education.

(*a*) *Courses in "Charm":*

This special project with "teen age" girls—the Charm Course—has continued in demand. Requests for this series of four lectures were received from 17 high schools and 22 other groups during the year. In addition to the school groups, neighborhood houses, girls' clubs and church groups have requseted this service.

Meetings with mothers of high school girls, following the Charm Course given their daughters, were held successfully in 10 towns, as compared with 2 requests the previous year.

Nineteen groups in 13 high schools were reached, at 41 single meetings, as compared with 6 such groups reached during the previous year. Aside from the school groups, 16 other groups were reached through 22 lectures. In addition, 10 adult groups were reached for lectures on the subject of "Charm".

At Forsyth Dental Infirmary, Simmons College, Wheelock School and Damon Hall Junior College, a series of discussions was given on various phases of health education.

(*b*) *Secondary Schools:*

In cooperating with the Coordinator of Health Education, a unit of study was prepared on "Appearing to Advantage", for a course of study planned for senior high schools. This included a self-check on personal appearance and habits of daily living with correlation of score to show relationship between the two. This score was received with enthusiasm by the girls.

A twenty-four hour study of high school activities was carried on in 1936. A questionnaire was prepared and 24 carefully selected high schools were requested to cooperate in the study. Of these, 21 responded by having the questionnaires filled out for the study. Three groups were included, one of which covered a total of 4,065 pupils in four of the large high schools; in 9 of the medium sized high schools 3,510 pupils were included; and in 8 small high schools 1,374 pupils completed the study, making in all a total of 8,949. A study of the records is now in progress.

(*c*) *Play Day — Child Health Day:*

The Child Health Day program for the year was an extension of the Play Day plan suggested for the previous year. Reports of having held Child Health Day celebrations were received from 119 schools. The Governor's Proclamation, newspaper releases and letters to superintendents of schools and school nurses were prepared for this activity. A rural Play Day, in cooperation with the State Department of Education, was held in the Town of Heath where seven schools participated in a delightful program. Such activities, in addition to offering splendid play opportunity, have a real social value.

(*d*) *Publicity:*

Consultation service was rendered to a number of communities regarding suitable publicity material in connection with their preparation for Well Child Conferences. News releases were prepared for Well Child Conferences, for visiting nursing associations requesting assistance in appeals for funds, and special releases for Mothers' Day and Play Day — Child Health Day.

A Health Education Worker of the Division cooperated with the Department publicity agent in the preparation of news releases pertinent to the activities of the Division.

Talks were given in several instances on "Publicity" and particular assistance rendered in the matter of planning window displays for Cohasset, Milford and Mansfield, to secure publicity in connection with local drives.

(*e*) *Exhibits, Posters, Pamphlets, etc.*

The Health Education Supervisor, in charge of the exhibits of the Department, had a particularly busy year. Much of his time was spent in planning and executing display material for four of the larger State Fairs. For exhibit and general use

during the year a total of 214 new pieces of display material was executed—131 for the Division of Child Hygiene and 83 for other Divisions of the Department. In addition to these, 262 pieces of display material were repaired, renovated, corrected to bring them up to date, or added to in order to put them in suitable condition for further use—233 for the Division of Child Hygiene and 29 for other Divisions.

Special exhibits were prepared for display at the annual meetings of the Massachusetts Medical Society, the State Dental Society, the State Nurses' Association, and a special exhibit planned for use at a branch of the Boston Public Library.

Special exhibits and printed matter were planned for use at the Family Information Center conducted by one of the large department stores in Boston. Likewise, such assistance was given to other stores in Boston and elsewhere in connection with Baby Week early in the year.

An exhibit of three units, one in public health nursing, one in nutrition and another in immunization against diphtheria, was planned in greatest detail, giving special consideration to efficient packing, speedy setting up and taking down, as well as for educational value and eye appeal. These exhibits were planned with a view to easy adjustment to fit any space available from five to fifteen feet in length. Four separate exhibits of the three units were produced and plans made for their display at 15 of the smaller fairs for which original contact was made by the Consultants in Public Health Nursing. The following sections of the State were reached in this manner: Berkshire Health District, 2 Fairs; Nashoba Health District, 3 Fairs; 1 each in Blandford, Bridgewater, Cummington, East Bridgewater, Littleton, Marshfield, Middlefield, Northampton, Sturbridge and Topsfield. These fairs offered an opportunity for the Department to come close to people not often reached in any other way with instruction and assistance.

As in previous years, upon request of the State Federation of Women's Clubs, the Department exhibits were on display at the Federation's annual conference.

Members of the health education staff were on duty at all the State Fairs, large and small, as were also the Consultant Nurses of the Division, to give advice and assistance to those desiring such service. Likewise, on other occasions where the Department display material was used there were on duty health education workers, nurses and nutritionists for this purpose.

The school visitation of the Health Education Supervisor and his plans to secure cooperation of local drawing supervisors in the correlation of art work with the teaching of health education, was continued on a small scale only during 1936 because of increased work on exhibit material. In this connection health slogans for poster making, as well as pamphlets on health subjects, are distributed by the Department. This is a continuation of work which was started some years ago in the public schools of the State which were quite universally reached. More recently the parochial schools were visited for this purpose, a total of 58 in 1936. Requests for health education material for this purpose during 1936 totalled 383,400 pieces, of which 286,060 were sent for public school use and 97,340 for parochial schools.

The Health Education Supervisor conferred with artists assigned to poster-making under Works Progress Administration projects, regarding requirements and general details of material being planned for the use of this Division and the Department. A series of posters on nutrition subjects was made available for use at Well Child Conferences and other field projects of the Division staff.

The booklet "One to Six" was completely revised this year, several members of the staff cooperating in bringing up to date the material in their particular fields. The "Dental Health Policy" was a revision of the former "Dental Policy" and was issued during the year, copies being sent to all dentists within the State. "Cooking for Health", Minerals and Vitamins", "Gain in Height and Weight by Years", "Good Eating Habits", "Aids to Bowel Movement", "Diet for Children from Birth to Two Years", "The Care of Your Teeth", "Suggestions for Care during Pregnancy" and "Supplies Necessary During Confinement" were among the pamphlets which were revised for reprinting during the year. "Your Guide for Buying, Preparing and Serving Good Meals at Low Cost" was revised as to content and food prices, and the Nutrition Number of *The Commonhealth* met with such demand that it was necessary to issue a reprint of it. As a contribution from

Massachusetts, copies were made available to other states starting nutrition work under the Social Security Program.

During the year eight new reprints were received for distribution and the new publications printed included the following: The Community Nutritionist; Suggested Daily and Monthly Report of School Nurse; Suggested Annual Report of School Physician; Summary of Defects Found at Well Child Conferences.

Four issues of the quarterly bulletin of the Department—*The Commonhealth*—were printed during the year, including the reprint issue of the "Nutrition in the Community" number. Other subjects covered were a "Reprint Number" which included reprinting of various articles for which great demand was being received; "Dental Health" and near the end of the year, "Parent Education."

From the Eastern States Exposition 1,622 orders were received for 18,061 pamphlets. From other fairs there were received 791 orders for 12,622 pamphlets. Through these Fairs numerous requests for our pamphlets were received from other states, as follows: Maine, New Hampshire, Vermont, Rhode Island, Connecticut, New York, New Jersey, Delaware, Kansas, Illinois, Michigan, and one each from China and New Zealand.

Exclusive of orders received through the State Fairs, requests were received from the following countries: Bermuda, Brazil, British Guiana, Canada, China, Ecuador, England, Greece, Hawaii, Ireland, Palestine, Philippine Islands, Scotland, South Africa and Spain.

The total number of pamphlets distributed during the year was 907,213, classified as follows:

	Pieces
Child Health Day material	2,000
Summer Round-Up material	59,175
Dental Hygiene material	141,504
Other publications	704,534
	907,213

(*f*) *Library:*

Several meetings of the Library Committee of the Department were held during the year and recommendations made for the purchase of new accessions to the Department Library and to the various special Division libraries. For the use of the Department staff there was added to the main library a total of 116 new books and pamphlets, each catalogued when received. The library carries magazine subscriptions to the number of 89 which are circulated throughout the Department to staff members weekly, averaging about 30 journals each day. The increase in personnel through the employment of additional staff members under the Social Security Program has added a very heavy burden to the work of the library staff. For the special use of staff members under the Social Security Program there were purchased during the year 131 new books and 1 new subscription to a journal, all in specialized fields.

Some work was done on cataloguing the books but there is yet much to be done before this is completed. The classification and cataloguing of reprints has been slowed up by the press of other library work.

(*g*) *Lectures, Motion Pictures, etc.:*

There were given during the year 850 lectures and 121 radio broadcasts, this service being given in 196 communities of the State and 3 outside Massachusetts. Aside from radio listeners, approximately 53,219 people were reached through lecture service rendered by the Department staff.

Motion picture films on health subjects were loaned to 87 communities of the State and delineascope film slides to 15 towns. In many schools teachers plan using motion pictures to supplement classroom talks on health subjects throughout the year.

Department exhibits were displayed in 71 communities. In addition to the lending of exhibits to local organizations occasionally they are displayed routinely at all the demonstration Well Child Conferences held by the Division staff, and many staff members make use of them in local activities. Posters are displayed routinely at the Well Child Conferences and nutritionists use them in their community demonstrations.

(*h*) *Prenatal and Postnatal Letters; and Father's Letter:*

At the close of the year there were on the registry for the monthly letters to prospective mothers and to mothers of children under two years of age approximately 28,935 names. The new requests for prenatal letters during the year totalled 8,861 names as against a total of 8,040 names the previous year; for the first-year postnatal letters, 8,285 as compared with 7,157 in 1935, both series of names being carried over to receive the second year postnatal letters later. On the registry for second-year postnatal letters at the close of the year there was a total of 13,860 names. The father's letter was sent to 8,861 fathers during the year.

(*i*) *Cooperation with Outside Agencies:*

We have continued our cooperation with other State Departments and outside agencies and a number of the staff of the Division were chosen to serve on committees and sub-committees of the Massachusetts Health Commission appointed by the legislature to consider health laws and practices in this State.

(*j*) *Staff Education:*

All of the Public Health Nursing Consultants and other staff nurses of the Division attended the two-day Institutes on "Communicable Diseases" conducted under the auspices of The Commonwealth Fund and the State Department of Public Health.

The Assistant Director of the Division and the two physicians on the Well Child Conferences were privileged to take advantage of the courses given under Social Security funds at the New England States Teaching Center.

The dentist took a course in Educational Methods at Harvard Summer School.

Two of the Consultant Nurses were given the privilege of taking special courses in physiotherapy at the Harvard School of Public Health in preparation for work with the program for the crippled child under the Social Security Program.

One Consultant took a course in Child Psychology planned especially for nurses and teachers, given by Springfield College, in the City of Pittsfield. This course was of college grade.

Another Nursing Consultant took a special course in Health Education at Worcester State Teachers' College.

The Nursing Consultant assigned to the work for premature infants took a special course given by Dr. Clifford at Boston Lying-In Hospital, in preparation for particular work in this field.

Several members of the staff attended the Social Workers' Conferences and the Tuberculosis Institutes held throughout the State at intervals during the year.

II. Special Projects

1. The Spring Floods:

Because of emergencies arising from the Spring floods in certain sections of the State a number of the staff of the Division were released to give assistance wherever possible. At the request of Mr. Davidson, Regional Representative of the American Red Cross, the nutritionists started actual work on flood relief, after this service had been offered the Red Cross by the Commissioner of Public Health. Arrangements were made with the disbursing agent of the Works Progress Administration for the shipment of surplus commodities available to Chicopee, Haverhill, Lawrence and Lowell where they were needed. Three emergency nutritionists were added to the staff for flood service. In all, eight gave about 125 days service (and some nights) in Hadley, Hatfield, Lawrence, Lowell and Northampton. Through this service the organization of better large-quantity feeding for the refugees was established and rehabilitation plans furthered. In the flood relief work the Health Education Supervisor assisted, cooperating with the American Legion particularly in the Lowell district. In Haverhill a Health Education Worker assisted the nutritionist in organizing the distribution of contributed food and planning for necessary supplementary foods for people able to cook in their own homes. This involved a system of sorting many truckloads of food, planning food orders for various sized families and aiding volunteer workers and others assisting in this work. The Department publication "Your Guide to Buying,

Preparing and Serving Good Meals at Low Cost" proved of practical use to families affected by the floods.

In Chicopee the nutritionist assisted in mass feeding of nearly one thousand refugees and the Flood Area Director of the Red Cross for that district stated that the work of the nutritionist there saved the Red Cross more than $10,000 in actual money on food, largely through the efficient plan set up during the emergency feeding.

2. Audiometer Testing:

Through the Social Security Program it was made possible to provide for the purchase of audiometers for the testing of the hearing of school children in communities where such service was not available through local activities. A very heavy demand followed the announcement of this service. Written request for audiometer testing is required from the local superintendents of schools and teachers and school nurses are invited to participate in the program. The actual testing is carried on by one of the physicians or the Consultant Nurses of the Division staff as is also the re-testing where it is required. Observation visits were made to several schools by members of the staff for the purpose of learning the technique and record-keeping, and a demonstration of the use of the audiometer was made available to the staff by the person carrying on such work for the Chelsea School Department. The school departments of Chelsea and Newton cooperated with the Department in this initial instruction and demonstration.

At the close of the year 41 superintendents of schools had made requests for the use of the audiometer in 88 towns, and a total of 8,964 children had been tested.

III. Personnel

So many new members were added to the staff through the enlarged program of the Division that it would be impossible to mention all by name. The staff was more than doubled during the past year.

Massachusetts Statistics for 1936

Population (Estimated as of July 1, 1936)	4,382,900
Death rate per 1,000 population (residents of Mass.)	11.7
Death rate per 1,000 population (non-residents of Mass.)	11.9
Infant mortality (per 1,000 live births)	46.1

REPORT OF THE DIVISION OF COMMUNICABLE DISEASES

Gaylord W. Anderson, M.D., *Director*
N. A. Nelson, M.D., *Assistant Director*

General Statement

The past year has been characterized by the lowest case and death rates for diphtheria, infantile paralysis, and whooping cough in the history of the State. Conversely, there has been a very sharp increase in the incidence of meningococcus meningitis and the first increase in typhoid fever since 1930. The total number of cases of communicable disease reported during the year was 106,115 as compared with 110,395 for 1935.

Prevalence of Certain Diseases

Anterior Poliomyelitis.—With only 51 cases and 8 deaths reported, anterior poliomyelitis reached the lowest reported level in the history of the Commonwealth, the previous minimum number of cases having been 61 in 1932, and the previous minimum number of deaths 9 in 1934. This virtual absence of poliomyelitis in Massachusetts was characteristic also of the entire northeastern section of the United States, which area had a fairly high incidence of the infection in 1935.

The actual incidence of the disease as compared with other years was actually less than is shown from these figures owing to the fact that there have been many non-paralytic cases included which, according to criteria of other years, would not have been called poliomyelitis. Thus, in May there was a definitely localized outbreak at the St. Mark's School in Southborough from which 19 cases were officially reported. These cases were unquestionably caused by contact from one boy to another, there being no evidence to suggest any other mode of spread. In addition to those cases which were reported, there were numerous others in boys who returned to their homes, where a diagnosis of poliomyelitis was made. Several features probably explain the apparently high attack rate in this outbreak. The group is unquestionably more susceptible to infections of this nature than are other boys of comparable age, as attested by the fact that the school periodically has outbreaks of such diseases as measles, chicken pox, and mumps, with a higher incidence than is usually encountered in this age group. Thus, there was unquestionably a higher level of susceptibility at St. Mark's than under ordinary circumstances, and the crowding of the boys in a sharply limited environment gave every opportunity for the spread of an upper respiratory tract virus. In addition there were many cases that were reported as poliomyelitis in which a definite diagnosis probably could not have been made had there not been a known exposure. In several of the cases the illness lasted but a day or two and lumbar puncture findings during the height of the illness were absolutely negative. Unquestionably these represented true cases of mild poliomyelitis virus infection. This outbreak thus gave an unusual opportunity for determining the true incidence of such infections in the presence of recognizable infantile paralysis. The records show that these cases were almost as numerous as was measles under comparable circumstances. It has been known for years that coincidental with an infantile outbreak there were many cases of an undiagnosable illness which probably were such mild infections, but these have never been as accurately enumerated as at this time. Through the cooperation of the Harvard Infantile Paralysis Commission and the United States Public Health Service a detailed study was made of this outbreak.

Unfortunately, the St. Mark's situation was widely publicized throughout the country by newspapers chiefly interested in alarming headlines. Coincidental with the outbreak there occurred a case at the Brooks School in North Andover, in which a diagnosis of infantile paralysis was made on the basis of a fever and negative spinal fluid findings. With the appearance of this case the school authorities immediately, without consulting the Department, dismissed the school, which caused even more newspaper headlines. The result was that many parts of the country were led to believe that New England was in the grip of a disastrous outbreak of infantile, a situation that threatened to seriously affect the summer trade of all New England. The subsequent experience of the summer more than justified the Department's stand at the time that there was no evidence whatsoever to indicate abnormal prevalence of the disease.

During the year the new system of reporting so as to distinguish between paralytic and non-paralytic cases has been given a first trial. While fundamentally correct in theory, it has not been highly successful in practice due to the failure of many boards of health to distinguish between the two types of cases in their reports. While the data on these cases have ultimately been obtained, the delay has been so great that the differentiation has been of little value for current use. It will take several years to train even the best organized boards of health to differentiate between the two forms in their reports. The services of the Department's consultants were requested in but nine cases.

Diphtheria.—The reported incidence of diphtheria fell to the lowest figure ever recorded in Massachusetts with only 307 cases reported as contrasted with 390 in 1935. Unfortunately, there was not a coincidental decline in deaths. A part of the decline in cases was due to the fact that in some communities where carriers had been previously reported, the records were straightened out to distinguish between carriers and cases. This explains a small part but not all of the decrease in cases. As usual Lowell had the highest case rate of any large city in the State, a distinction that it has had for several years. Of the 26 diphtheria deaths that occurred during the year, 8 were in Lowell, as contrasted with only 4 for all of 1935. Thus, although there was some slight decline in cases in Lowell, there was a sharp increase in deaths and, consequently, an increase in case fatality rate to an astonishingly high figure. The localized outbreak in Chicopee the end of 1935 came to an abrupt end about the middle of January, 1936, which was about one month after the completion of a rather extensive immunization program. Springfield continues with the best record of the larger cities in the State, having had no case of diphtheria since August, 1935. The outstanding change in local diphtheria situations is found in Somerville where the 1935 figure of 21 cases and 2 deaths declined to a figure of but 5 cases and no deaths. This has been brought about by the first sustained immunization program ever carried on in that city, 8,000 children having been immunized in 1935 and 1,200 in 1936. The age distribution of these children is not exactly known. This is the only program of any size that has been carried on in Massachusetts with the use of alum precipitated toxoid. No figures are yet available as to re Schick tests on any of this group.

During the past year there have been few large immunization programs, the greater portion of the work being the usual continuation of the immunization in the school and preschool groups. The principal exception was in Chicopee where, after an extensive program in December, 1935, a further drive was put on in February subsequent to a house to house canvassing by Board of Health nurses. The Board of Health of Lowell, faced with a high diphtheria rate, voted to discontinue all immunization clinics and leave the work entirely to family physicians, a vote which was, however, later rescinded and the work resumed though not on as extensive a scale as in many other communities. By the end of the year, immunization programs had been conducted at one time or another in every community in Massachusetts except the Town of Savoy. On the other hand, there are several communities where it has been neglected so long that a large susceptible group has developed. Notable among these at the present time are the towns of Hanson, Southborough, and Montague. Such a situation existed a year ago in Franklin and Amesbury, but has been corrected during the year. It seems unlikely that, with the present board of health organizations, we can rely upon them to carry on immunization work year after year without a prodding from the Department unless they obtain annual appropriations therefor, or unless there is legislation compelling them to carry on this work.

In spite of the interest that has been shown elsewhere in the use of one dose alum precipitated toxoid, the Department has continued to recommend against its use and to insist upon three doses of toxoid at three-week intervals. This attitude has been based upon an uncertainty as to the permanency of the immunizing effect of anything less than three injections, and hesitation about using the alum precipitated material due to the possibility of abscess formation. It is becoming apparent that the position of the Department was well taken in refusing to lessen the number of injections. Recent studies from Ohio show that of over 500 children Schick negative a few months after one dose of alum toxoid, over 55 per cent had lost this immunity within two years. Similarly, studies in Detroit of those children

who contracted diphtheria during 1935 showed that some 40 per cent had presumably been immunized. Two doses of toxoid a month apart, or more recently one dose of alum precipitated toxoid had been the accepted methods of immunization in that city. Study of an equally large group in Massachusetts showed that less than 10 per cent had presumably been immunized and that in at least half of these there was doubt as to the diagnosis owing to the absence of confirmatory cultures. It is thus apparent that there are not yet adequate grounds for believing that the number of injections can be reduced below three without incurring an unnecessary risk of failures in immunization.

Gastro-Enteritis.—The past year has seen the usual number of outbreaks of gastro-enteritis. As was pointed out last year, some of these appear to be gastro-intestinal infections spread by contact and presumably respiratory borne. This is a type of disease that is encountered from time to time as a widespread infection throughout the community, but is never severe and is frequently called intestinal grippe for want of a better name.

Specific outbreaks of gastro-enteritis following banquets or other meals continue to occur. Several such have been investigated during the past year but, unfortunately, without yielding any very definite results. It is interesting to note that the majority of these follow a meal or banquet where poultry has been served. It is, of course, possible that this is more apparent than real inasmuch as poultry is so frequently served at banquets, and it is only when a large group is affected that the cases come to the attention of the Department. Another group of cases occur following the eating of pastry, usually filled with whipped cream or a custard. From one such outbreak at the Shirley Industrial School hemolytic streptococci were isolated, but it was not possible to prove that they were pathogenic. The recent work of Dick and his associates in Chicago has reopened the entire question of food poisoning through the observation that many organisms would produce toxins only if grown on certain specific medium. It is thus apparent that such organisms as staphylococci may be perfectly harmless in some things, but if they grow in other foods might produce potent toxins.

"Influenza."—The past year has been remarkably free from scares or rumors of "influenza" both in Massachusetts and in other parts of the country. There is no evidence that at any time during the year did "influenza-like" conditions become prevalent in any widespread area throughout the Commonwealth.

Malaria.—Thirteen cases were reported during the year. Nine of these were unquestionably infected outside of Massachusetts; two were "therapeutic malaria" and the remaining two were probably local infections in Natick and Quincy, respectively.

Measles.—This disease, the incidence of which was extremely low throughout Massachusetts during 1935, became quite prevalent in the eastern part of the State late in the spring so that May and June found it at a higher peak than for several years. It appeared so late, however, that it did not assume the widespread proportions which are frequently found in epidemic years, thus suggesting that we will have a recurrence of it during the winter of 1936 and 1937. Although the number of cases increased above that of 1935, there was an actual decrease in the number of deaths, and the case fatality rate reached the lowest level ever recorded in the history of the Commonwealth. While this is in part due to better reporting of cases, it seems unlikely that this is the entire explanation. It is extremely significant that even with measles much more prevalent during the spring than in former years, and pneumonia also more prevalent, there was a striking decline in the case fatality of the disease during this period. It seems likely that better medical and nursing attention to the small children is the most plausible explanation of this.

Meningococcus Meningitis.—With 191 cases and 100 deaths reported the morbidity rate for this disease reached the highest level since 1919 and the highest death rate since 1920. The high incidence of this disease in Massachusetts is but a part of a general increased prevalence throughout the eastern part of the United States. The incidence of this disease normally shows wave-like cycles of some five years' duration. The lowest level ever recorded in the State was reached in 1933; 1934 and 1935 showed progressive increases. The end of 1935 saw a rapid increase which was experienced with full force during the winter and spring of

1936. The situation was made doubly bad through the infection of the prison colony at the Bridgewater State Farm and the Long Island Hospital in Boston. At the Farm, some 14 cases and 6 deaths occurred. In addition, 3 cases developed in persons who had recently been discharged from the prison. Except for one case in Natick who had intimate contact with one of this latter group after his discharge there is no evidence that any case of meningitis developed from exposure to a person discharged from the State Farm. At the Farm the disease was limited to the prison section and was due in large measure to the high degree of overcrowding that exists in this group. In the control of the disease reliance was placed upon measures to reduce the overcrowding, particularly in the dining hall and the "shanty" which was the only congregating spot for the group. The outbreak at Long Island Hospital involved 19 persons of whom 14 died. In contradistinction to the handling of the Bridgewater outbreak, the control of the Long Island situation was attempted through cultural methods by the Boston Board of Health with far stricter isolation and quarantine procedures. Viewed in retrospect there is no evidence that one method was in any way superior to the other, both being equally ineffective in preventing the spread of the disease within the exposed group. These two outbreaks with their high number of deaths raised very strikingly the case fatality and mortality rates. Even excepting these, however, there was a very marked increase in the incidence of the disease through the State.

Pneumonia, Lobar.—The reported incidence of lobar pneumonia during the past year showed a marked increase over the level of the previous year, reaching the highest figure reported since 1925. At the same time the death rate also increased to the highest figure since 1929. To what extent the increase in reported incidence may be a measure of better reporting cannot be determined, but the increase in deaths indicates that the disease was actually more prevalent than for the several preceding years. During the first four months of the year, the current incidence of both cases and deaths was strikingly above that of 1935. About the first of May, however, there was a decline in the incidence of the disease so that during the last part of the year it was less prevalent than during the corresponding period of the preceding year. This shift in incidence occurring about the first of May appears to be quite characteristic of lobar pneumonia.

Study of the incidence of various types of pneumococci showed that during the winter of 1935–1936 Type I increased rapidly throughout the fall and early winter, reaching a peak in January following which there was an actual decline in the incidence of this type. This peak in January was reflected in the death rate which was for that month the highest throughout the winter. The Type II cases ran roughly parallel to Type I. Coincidental with the decline of the incidence of Type I infections there was an actual and also a relative increase in the prevalence of Type V pneumococcus infections. This reached its peak in March when, in the Metropolitan area, the actual prevalence of Type V was higher than that of Type I. The seasonal incidence of Types VII and VIII roughly paralleled that of Type V though at no time reaching the same level of incidence. This phenomenon could not be studied as well in other parts of the State as it was only in the State Laboratory and that of the Boston City Hospital that complete typing was carried on. Further study in future years may well show that some of the seasonal fluctuations in pneumonia are due to coincidental fluctuations in the incidence of specific types. This is a point which needs intensive study in the future and for which the laboratory records now accumulating in the State will be of inestimable value.

The past year was the first during which the State had completely taken over the work of the Pneumonia Study previously carried on by the Commonwealth Fund. This has been so taken over that the manufacture, distribution, and use of pneumonia serum has now become an integral part of the public health structure of the State. Massachusetts thus becomes the first state in the Union to have put the use of pneumonia serum on this basis. This has been made possible through the establishment of typing laboratories in hospitals throughout the Commonwealth, the serum being furnished to these hospitals to be issued only on the basis of positive laboratory reports. While unquestionably there are many cases of pneumonia today that might well be treated with serum that are not receiving this form of treatment, it is apparent, however, that there has been an increase in the interest in and use of antipneumococcus serum on the part of the medical

profession. To what extent the Department's program for the use of serum has affected the death rate of the disease cannot be determined at the present time. Although the existence of other factors may make it impossible to measure the effect through any decline in the death rate, the use of the serum has nevertheless been responsible for the saving of many lives. The problem that presents itself to the Department at the present time is that of increasing its use in the treatment of those patients for whom it is indicated. This is a problem of education of the public and the medical profession.

Rabies.—The reported incidence of rabies in animals reached the lowest level in years and possibly the lowest level in the recent history of the State. During the first few years that rabies was reported, the reporting was so inadequate that no judgment can be formed from those early figures. The decline in 1936 was very striking with only 136 cases reported as compared with 278 in 1935. The cases that occurred were very largely in the northeastern and north metropolitan areas, with an independent focus in Worcester and neighboring communities. During the early part of the year the disease was abnormally prevalent in Lawrence, in which city it had been apparently introduced late in 1935 by a dog which came up there from Malden. As the year ended there were apparently four active foci in the State, one around Chelsea, Winthrop, and Revere, another in Winchester and Arlington, a third in Andover and North Andover, and a fourth around Phillipston and Templeton. No human cases of rabies occurred during the year.

To what extent the dog immunization clinics might have been responsible for the reduction in rabies cannot be determined at the present moment. It is apparent, however, from data already available that they have played at least some part in reducing the disease, and that in those communities where such clinics have been conducted the disease had occurred very selectively in those dogs that were not immunized. Failures of immunization have, however, occurred, but these have been infrequent enough to warrant the conclusion that dog immunization is a valuable adjunct to our rabies control measures in Massachusetts. It is probably even more important than in other states as the absence of provision for area quarantine very definitely limits the effectiveness of restraint orders. During the past year, dog immunization clinics have been conducted in the following communities: Andover, Arlington, Bedford, Belmont, Brockton, Danvers, Everett, Framingham, Hingham, Holden, Hopkinton, Lawrence, Lexington, Lynn, Malden, Marlborough, Maynard, Milford, Natick, Needham, Norwood, North Andover, Reading, Saugus, Somerville, Stoneham, Swampscott, Wakefield, Wellesley, West Boylston, Winchester, Winthrop, and Worcester.

Scarlet Fever.—The past year has seen a slight increase in the reported incidence of scarlet fever though the death rate declined to the lowest figure ever recorded in the history of the State with only 44 deaths reported. Studies of scarlet fever immunization using a formolized toxin have been continued and extended during the past year. During the five years of these studies, the Department has Dick tested over 20,000 children and immunized over 10,000 of these with this solution. These studies have been carried on in institutions, including the children's tuberculosis sanatoria under the Department, and the schools for feeble-minded. In these two groups of institutions the immunization has been a routine procedure for a number of years. In addition community studies have been carried on in Wellesley, East Bridgewater, Bridgewater, Shirley, Holliston, Greenfield, Gloucester, Leverett, Rockport, Shutesbury, and the Berkshire Health District.

In addition to these studies, immunization in the parochial school system has been carried on in Worcester for over two years, and during the past fall was extended to the cities of Fall River and Springfield. It has become apparent that the most valuable results are going to come from those places (Fall River, Springfield, and Worcester) where a relatively small fraction of the children have been immunized. In other communities where the immunization has been offered to all children in the community, so large a percentage of the total have availed themselves of the opportunity that it has become impossible to gather conclusive data as to the value of the material. In all of these communities the incidence of the disease has been abnormally low. This is probably significant, but there is also the chance that these communities might have had a low incidence for several years even without immunization, especially when it is remembered that these and

other communities in the past have gone for several years with a virtual absence of the disease only to have it recur at a later time. Studies of a smaller sample of the population distributed throughout the city, as in Fall River, Springfield, and Worcester, will, therefore, yield more conclusive data as the immunization cannot possibly interfere with the general prevalance of the disease. The data which are so far available continue to indicate a very considerable degree of protection from this immunization method. At the same time it is apparent that there is more clinical protection than might be surmised from a study of the effect of the solution in reversing the Dick test.

Septic Sore Throat.—One hundred fifty-six cases of this disease were reported during the year. Probably all of these were sporadic infections spread through contact. There was no evidence at any time to suspect that milk might have been responsible for the spread of the disease.

Smallpox.—Nineteen hundred and thirty-six has marked the fourth consecutive calendar year during which there has not been a single case of smallpox reported in Massachusetts. While it is always possible that a sporadic case might have occurred undiagnosed and unreported, there is no evidence to believe that such has occurred, and there is every reason to believe that the State has actually been free from smallpox since the termination of the Fitchburg outbreak in February, 1932. This means then a period of approximately five years without a case, which is a striking tribute to the efficacy not only of vaccination but also of the law requiring vaccination as a prerequisite to school attendance. Figures as to the percentage of the children so protected in various parts of the State vary considerably, but usually run above 95 per cent and in some instances as high as 100 per cent. This is made possible not only by strict enforcement of the vaccination law in the public schools, but also through the voluntary enforcement of a vaccination requirement in many of the private schools, notably the parochial schools.

Tuberculosis.—The reported cases and deaths from pulmonary tuberculosis reached the lowest level in the history of the State, though the extra-pulmonary rates showed a slight increase over those of 1935.

Typhoid Fever.—For the first time in six years there has been an increase in the reported incidence of this disease, though the number of deaths was the same as in 1935. The increase in cases was due entirely to a single outbreak in Lowell. If these were subtracted from the total, the number of endemic infections would have shown a slight decline below the 1935 level. Fortunately in this outbreak of 38 cases there was not a single death, thus leaving the death rate unchanged and at the same time bringing about a remarkably low case fatality rate for the entire State.

This outbreak in Lowell, which was the largest in the State since the Saxonville outbreak of 1930, followed a banquet, some of the food of which was sent to an orphanage. That the infection was unquestionably associated with the food served at the banquet was shown by the occurrence of typhoid fever cases at an orphanage, among Lowell residents at the banquet, and among residents of other communities who were in Lowell only for the banquet. The diagnosis of typhoid is unquestioned, owing to the isolation of the organisms from a large number of the reported cases.

While the source of the infection could not be conclusively proved, it seems probable that it could be traced back to a missed case of typhoid in an employee of the milk company delivering milk to the caterer who served the banquet. That this employee was probably a missed case of typhoid, possibly modified by previous inoculation at the time of the flood, was shown by the isolation of typhoid organisms from his stools on two separate occasions, though subsequent specimens both of stools and of the bile have been consistently negative. It would appear most likely that the infection had been introduced into the catering establishment through his handling the cap of the milk can, where the organisms stayed alive for a number of hours and were then transferred to the hands of a kitchen employee, who opened the cans, and from his hands directly to the turkey which he was slicing. In the bacteriological laboratory it was demonstrated that organisms could stay alive under these conditions for a considerably longer period than was necessary to explain this outbreak. Whether or not this was actually the mode of infection will never be determined, though it was amply demonstrated that the infection

could have occurred in this way and there were many circumstances which support this hypothesis.

During the flood at the end of March much apprehension was created in many communities as to the possible menace of typhoid fever. This apprehension was aggravated by certain alarming broadcasts as well as by the action of some boards of health in either ordering or urging immunization against typhoid of all persons entering the flooded area. The Department strongly recommended against routine typhoid inoculation of persons entering the flooded area as it believed that this was entirely unnecessary, would create a sense of false security, and because the reactions would delay the rehabilitation of these areas. In spite of the advice of the Department, certain communities immunized on a very extensive basis. Others followed the advice of the Department and did no immunization. That this immunization was unnecessary and the advice of the Department sound was shown by the fact that in neither group of communities was there any typhoid that could be traced to the flood. During the month following the flood there was only one case of typhoid in the entire Commonwealth and that was not even in the flooded area. It was perhaps the irony of fate that Lowell, which did the largest and most hysterical job of immunizing, should be the community to have a widespread outbreak of typhoid later in the year. Perhaps the typhoid immunization in the spring modified or prevented a few infections, and perhaps it also made it possible for the milk handler in question, who had been immunized in the spring, to have a mild, unrecognized infection rather than a frank case which would have incapacitated him from delivering this milk. The experience of the flood shows that so long as the public water supplies of the State continue safe to use there is no need for typhoid immunization in Massachusetts merely because certain homes are flooded by river water. It is hoped that this lesson will be remembered in future years.

Investigation of the 135 cases of typhoid that occurred during the year brought to light 15 carriers, as shown by the following table:

Year	Cases of Typhoid	Carriers Added to List	Rate per 100 Cases	Carriers Found in Investigation of Cases	Rate per 100 Cases
1932	214	13	6.1	10	4.7
1933	162	19	11.7	14	8.6
1934	134	18	13.4	13	9.7
1935	112	15	13.4	12	10.7
1936	135	15	11.1	13	9.6

Adequate release cultures prior to discharge from official supervision were obtained in all but six of the 125 patients who recovered from typhoid. Three of these persons are still under supervision as their cultures have continued consistently positive.

Year	Reported Cases	Deaths	Living Cases	Number Having Release Cultures	Per Cent Release Cultures
1932	214	25	189	172	91
1933	162	22	140	132	94
1934	134	13	121	118	98
1935	112	10	102	100	98
1936	135	10	125	117	94

The typhoid carrier list increased from 108 to 115. Two of the carriers died during the year, 3 were taken off the list following gallbladder removal, and two moved out of the State. Two of the carriers added to the list during the year underwent gallbladder removal very shortly after their discovery.

Of the 135 cases of typhoid, the source of infection was found in 63; of these, 38 were due to food infected at a banquet, as noted above, 17 to contact with a carrier, and 8 to known direct contact with a recognized case of typhoid. Of the latter, one is of special significance inasmuch as she was a nurse caring for a known case of typhoid and had been advised by the attending physician that immunization was unnecessary. One other unimmunized nurse contracted the disease in line of duty.

Undulant Fever.—The past year showed a marked increase in the incidence of recognized cases of undulant fever, the number increasing from 42 in 1935 to 55 in 1936. There were at the same time 4 deaths from the disease. Of the cases, all

but 3 gave a history of the habitual use of raw milk, although only 15 per cent of the milk in the State is sold raw. The cases were concentrated very largely in the Berkshires and in the area around Attleboro, with the rest of the cases widely scattered throughout the State. Two definite outbreaks occurred. Several cases in and around Pittsfield gave a history of taking raw milk from one farm on which it was known that there was a high infection rate with contagious abortion. The proprietor of this farm had tried in vain to control this disease through a program of slaughtering all known reactors. That this farm was selling special raw milk indicates how little protection is implied by the mere fact that the milk comes up to the present standards for special milk. Three cases in and around North Adams were users of raw milk from a single dairy in Clarksburg. This herd had been infected with contagious abortion for many years, without known human cases. It is of interest that during the past year an attempt was made to control this infection in the herd through the use of living vaccines which were injected not only into calves but into lactating animals. This may, of course, be coincidence or it may be that the human infection was due to the vaccine.

The public health problem presented by undulant fever is one which is assuming far greater proportions than in former years. It is today in Massachusetts the outstanding milk-borne disease; for its prevention we know but one method, namely, pasteurization. It is fatuous to argue at the present time that the infection cannot be spread through milk as this has been amply demonstrated to the satisfaction of all but the biased. Attempts to control the disease in cattle through vaccination may possibly be effective from the point of view of agricultural economics, but it is yet to be shown that it is safe from the point of view of the human consumer. It has been amply demonstrated that vaccination of adult animals constitutes a hazard to the consumer and is a practice which, while actively supported by certain commercial interests, is one which should be discouraged and might possibly even require legislation to prevent. Whether or not the Federal research program of vaccination of calves may yield a protection without a hazard to the milk consumer remains to be demonstrated. In the meantime, combining vaccination of cattle with pasteurization of the milk from these cattle offers a program which is of benefit to the farmer and the public alike. At the same time, there is ample evidence to warrant a regulation of the Milk Regulation Board requiring that special milk should come from abortus-free herds.

Whooping Cough.—After a year of very light incidence of whooping cough, the disease increased rapidly during 1936, reaching a level only slightly below the average for the last five years. It is of interest, however, that in spite of this increase in the disease the number of deaths fell to the lowest figure ever recorded in the history of the Commonwealth, making a death rate of 1.2 as compared with the previous minimum of 1.5 reached in 1935. It seems probable, however, that the decline is due in large part to better medical and nursing care of these cases, which in turn is a reflection of better public appreciation of the importance of whooping cough in small children.

Outbreaks

January–March.—Meningococcus Meningitis; Bridgewater State Farm. Cases occurred in the prison section of the farm, due in large part to overcrowding. Three cases occurred in persons discharged from Bridgewater a day or so before onset. 17 cases; 8 deaths.

February.—Gastro-enteritis; Abbott Academy, Andover. A short outbreak of gastro-intestinal disturbance in 19 of the boarding pupils, with sudden onset. Cause not determined.

February–March.—Meningococcus Meningitis; Long Island Hospital, Boston. Nineteen cases in the male patients and staff employees. 19 cases; 14 deaths.

March.—Gastro-enteritis; Attleboro. Coincidental with the high water in the Attleboro section (a week before the flood in the Connecticut and Merrimack) a large number of cases of gastro-enteritis occurred in Attleboro. Examination of the water supply showed no evidence of pollution and investigation of the cases disclosed that they had been occurring for a period of three weeks; in other words, long before the high water threatened the well field. Probably respiratory spread.

May–June.—Anterior Poliomyelitis; St. Mark's School, Southborough. Un-

known number of cases, many mild, spread by direct contact in a very susceptible group. Only 8 were paralytic cases. 19 cases; 1 death.

June.—Gastro-enteritis; South Hadley. At the Boy Scout's Camp about 20 boys taken suddenly ill with vomiting, diarrhea, and pain in abdomen. Cause not found.

June–October.—Undulant Fever; Pittsfield. An outbreak of undulant fever in and around Pittsfield, due to milk from one particular herd. Seven cases, all of whom had been using raw milk from this one herd.

July.—Typhoid Fever; Lowell. An outbreak of typhoid fever due to food served at a banquet of the Franco-American Society and sent in part to the Franco-American Orphanage. Cases appeared in other communities in individuals that were at the banquet. Stool and urine samples from the employees of the catering establishment where the food was prepared were consistently negative for typhoid. No history of comparable illness following any other banquet served before or since by the same establishment. Only suggestive lead was fact that stool specimens obtained from the driver of the truck delivering milk to the catering firm yielded typhoid organisms.

July.—Food Poisoning. Banquet held in Manchester, New Hampshire, attended by many people from Massachusetts, large number of whom were acutely ill following the noon meal, the majority of them being hospitalized in New Hampshire. Most of food prepared in Sudbury, Massachusetts, on a farm and transported to Manchester a day or so before the party. Nothing definite found as to mode of infection, but little doubt that any food infected during the preparation had plenty of opportunity to incubate before being eaten.

July.—Gastro-enteritis; Camp Yokum, Becket. An outbreak of gastro-enteritis involving 40 out of 41 campers. Cause not determined.

August.—Food Poisoning; Shirely. An outbreak of food poisoning at the Industrial School, epidemiological findings suggesting a chicken salad or cream puffs—more likely the former. Specimens of food were obtained and hemolytic staphylococcus were grown from both. These were further grown in eclairs and cream puffs and fed to monkeys at the Harvard Medical School without obtaining any evidence that this particular strain of hemolytic staphylococcus was pathogenic.

September.—Typhoid Fever, Attleboro. Investigation of a case of typhoid fever in Attleboro brought to light a family outbreak caused by the grandmother, a resident of Rhode Island. The first case was the grandchild, who in turn infected both the father and the mother. The infection in the grandchild was missed at the time, coming to light only when a diagnosis of typhoid was made on the mother. Grandmother found to be carrier.

September.—Gastro-enteritis; Norfolk Prison Colony. Explosive outbreak of gastro-enteritis attended by blood in the stools. Repeated culturing failed to bring to light any organism of the dysentery group.

October.—Gastro-enteritis; Groton School. About 35 cases of excessive vomiting with marked dysentery, from one to two days. Possibly due to milk from cows with mastitis, milk from which was being incorporated with the general supply of the school.

October.—Gastro-enteritis; Steven's Village, North Andover. Nineteen cases of gastro-enteritis occurred in a section of approximately fifty homes. Duration of the illness was from six to twenty-four hours with diarrhea and vomiting. Probably respiratory spread.

October–November–December.—Scarlet Fever; Mount Hermon School, Gill. Spread by contact. At beginning of outbreak, Department Dick-tested and immunized with toxoid. Immunization completed by December 1. Twenty-four cases in October, 25 in November, and 4 in December. After last injection, 3 out of 4 cases were in non-immunized boys, though 90 per cent of school were either Dick negative or immunized.

December.—Meningococcus Meningitis; Tewksbury State Infirmary. Three cases among employees; 3 deaths.

Genitoinfectious Diseases

The year 1936 has seen unusual activity in the field of genitoinfectious disease control. The United States Public Health Service, under the direction of Surgeon

General Parran and as a result of the passage of the Social Security Act by Congress, has contributed considerable sums to State and local health departments throughout the country for the development of programs for the control of gonorrhea and syphilis in line with the recommendations of the Advisory Committee to the United States Public Health Service for control programs in State and local health departments, of which committee the Assistant Director of this Division is a member.

The appearance in the Reader's Digest of July, 1936, of an article by Surgeon General Parran entitled "Why Don't We Stamp Out Syphilis?" has served very generally to lift the lid of censorship against public discussion of these diseases. Where there was heretofore a need for seeking speaking engagements, it is now somewhat difficult to keep up with the demand. It is probable that the effect of this eruption of syphilis and gonorrhea into the public consciousness has been more noticeable in some other parts of the country, where programs for the control of gonorrhea and syphilis have been very sketchy at the best, than in Massachusetts. Here the effect has been more to speed up a program which has been developing over a number of years.

The immediate effect of the Social Security program in Massachusetts has been the extension of follow-up service in several of the clinics, the continuation of the experiment of the follow-up of private physicians' cases, the expansion of administrative personnel, and the limited distribution of bismuth.

Statistical Summaries.—The following analyses will indicate the trends of reporting during the past several years, as well as the sources of these reports. The proportionate increase in reporting by physicians is gratifying evidence of their increased cooperation. The numerical decline in cases of syphilis reported by clinics has been held to be one indication of a decline in the prevalence of syphilis. The numerical increase in cases reported by institutions is evidence of continued improvement in their cooperation.

Sources of Reports of Gonorrhea

Year	Total Cases	Number Reporting	Physicians Cases	Physicians Per Cent	Clinics Cases	Clinics Per Cent	Institutions Cases	Institutions Per Cent
1932	6738	846	3180	47.2	2924	43.4	634	9.4
1933	6591	824	3190	48.4	2874	43.6	527	8.0
1934	6538	845	3164	48.4	2825	43.2	549	8.4
1935	6193	876	3003	48.5	2633	42.5	557	9.0
1936	6097	958	3268	53.6	2280	37.4	549	9.0

Sources of Reports of Syphilis

1932	4530	442	879	19.4	2781	61.4	870	19.2
1933	4466	428	911	20.4	2867	64.2	688	15.4
1934	4471	360	921	20.6	2942	65.8	608	13.6
1935	5317	703	1472	27.7	2783	52.3	1062	20.0
1936	5524	906	1934	35.0	2491	45.1	1099	19.9

Although the increase in reporting of syphilis has been so great during the last two years that there has been an apparent halt in the downward trend of early syphilis (i. e., in the incidence of syphilis), it is believed that this halt is more apparent than real. Whether or not this is so may not be determined until the trend over the next four or five years can be observed.

Physicians Reporting Gonorrhea or Syphilis*

Year	Reported Either or Both	First Report Since 1929	Accumulative Total
1930	1082	1082	1082
1931	1092	420	1502
1932	1058	281	1783
1933	1067	281	2064
1934	1051	200	2264
1935	1239	309	2576
1936	1432	313	2889

*About 6,000 physicians in State in 1930 and 6,700 in 1936.

*Communities Represented**

Year	1930	1931	1932	1933	1934	1935	1936
Number	257	269	256	254	283	287	280

*355 cities and towns in State.

There were 194 deaths from syphilis, a rate per 100,000 population of 4.5. If deaths from general paralysis of the insane and tabes dorsalis are included, the total of deaths from syphilis was 337, a rate of 7.7 per 100,000 population.

Clinics.—The twenty-six Massachusetts clinics which make monthly reports to the Department admitted 2,388 new cases of gonorrhea and 2,679 new cases of syphilis, a total of 5,067 as compared to 5,429 in 1935, a decrease of 362. These patients made 260,602 visits as compared to 272,928 in 1935, a decrease of 12,326. The total attendance at these clinics was 16,291 different individuals, as compared to 15,516 in 1935. It is difficult properly to interpret this increase in individuals attending in the face of a decrease in the total number of visits made. It may mean either that the visits per patient have declined because of greater neglect of treatment, or it may mean that larger numbers of patients are remaining under observation after treatment has been stopped, who are required to make only one or two visits a year. Such an increase in patients under observation would decrease the average number of visits per patient. This decline in the total number of visits is the first for many years.

For the fourth year the Boston Dispensary has been assisted by the Massachusetts Society for Social Hygiene and this Department in providing treatment at night clinics for patients able to pay only a part of the fee or no fee at all. The average monthly attendance at these clinics of patients unable to pay the full fee has declined from 202 to 146 per month. However, it appears that these non-paying patients remained under treatment longer than last year, since slightly more treatments were given at a reduced fee or no fee than last year, the total number being 5,837. There were 285 new cases admitted to this night clinic during the year.

During the summer, a medical student was engaged for three months to go over the records of new admissions for primary and secondary syphilis at the Boston Dispensary and the Massachusetts General Hospital. It has not yet been possible to complete analysis of the data collected.

During the year, also, data have been collected concerning more than 300 cases of gonococcal vulvovaginitis admitted to the Boston Dispensary since 1918, analysis of which, it is hoped, will give some constructive evidence as to the comparative effectiveness of the simple form of treatment used at the Dispensary compared with more complicated methods of treatment in general use elsewhere.

Through clinic subsidy, full-time follow-up service for gonorrhea and syphilis has been added to clinics at Pittsfield, Fitchburg, Springfield, Worcester, and Boston. The clinics at Pittsfield and Springfield had previously had part-time service, which is still available, so that the new service adds just so much to the previous service. The clinic at Fitchburg had not previously had any follow-up service and it was badly needed. The Worcester City Hospital and the Worcester Memorial Hospital have entered into a community follow-up service, both hospitals utilizing the full-time services of one worker.

In Boston, six clinics (Massachusetts General Hospital, Boston Dispensary, Massachusetts Memorial Hospitals, Peter Bent Brigham Hospital, Beth Israel Hospital, and Children's Hospital) have entered into an unusual joint follow-up project. Five full-time nurses or social workers have been employed jointly by these six hospitals. The Metropolitan Boston area, comprising sixty or more communities, has been divided into five districts, each served by one follow-up worker who follows all lapsed cases and contacts in her district for all of the six hospitals. This project was begun on the first of July and five months' experience with it has proved most satisfactory both to the Department and to the several cooperating clinics. Nearly 1,000 persons have been referred to these workers for investigation, and the number of persons who have had to be reported through this Department by these clinics for follow-up has decreased almost to the vanishing point. It will be interesting to watch this project through the coming months as it represents a new departure in community service involving the cooperation of a number of independent institutions in the use of a common follow-up personnel. Perhaps the future may see a similar cooperative use of medical and other services, which would most certainly result in uniform improvement of the independent units participating therein.

The volume of new work produced by the efforts of the new follow-up workers has made it necessary to provide additional half-time clerical service in the Pittsfield, Fitchburg, Worcester, Springfield, and five of the six Boston clinics. The total cost of the entire new follow-up service in the State will be at the rate of

$21,600 per year. Thus, the total State expenditure for the maintenance of clinic facilities exceeds $35,000 per year.

Fever Therapy.—The experiment in the fever treatment of other forms of syphilis than neurosyphilis, which has been conducted jointly by the Boston Dispensary, the Boston Psychopathic Hospital, and this Department, has not proved to be particularly successful because of the inability of the several clinics which might have provided material to persuade patients who do not have neurosyphilis to submit to fever therapy. Accordingly, the Department of Mental Diseases has been requested and has agreed to provide in its budget for next year, for the complete take-over of the two Kettering Hypertherms and their operation.

Boards of Health.—Boards of health have followed persons reported by name as having prematurely discontinued treatment or as having been in contact with infected persons, as follows:

Follow-up by Boards of Health

Year	Cases	Per Cent Found	Number of Communities	No Report from Board of Health Per Cent of Cases	Communities
1932	2936	41.8	135	5.2	?
1933	3989	45.0	135	5.6	44
1934	3578	45.8	153	4.9	50
1935	3637	47.3	140	5.0	38
1936	3663	51.3	157	5.0	39

It is expected that, as the new follow-up service in the clinics makes itself felt, lapses not only will be fewer but those patients who do prematurely discontinue treatment will be returned to treatment without reference to this Department and local boards of health so as to materially reduce the existing load. It is interesting to note that 51.3 per cent of the 3,663 persons reported to local boards of health were found in 1936. This is the first time that more than half the patients have been found.

Arsenicals.—The total distribution of arsenicals decreased from 55,830 grams in 1935 to 53,514 grams in 1936. However, 136.8 grams of Mapharsen have also been distributed to certain clinics for study purposes. This is the equivalent of 1,368 grams of arsenical, which, added to the above, makes a total of 54,882 grams. This is still less than the amount distributed in 1935. Whether this decline in the distribution of arsenicals may be considered as additional evidence of the declining incidence of syphilis is a question, the answer to which will have to wait upon experience during the next few years. However, it does conform with what might be expected if evidence from various other sources may be believed.

It will be noted from Table XVI that more physicians have used the State's arsenicals and in larger amounts than ever before. Nearly 85 per cent of the physicians receiving arsenicals this year have reported syphilis at one time or another, and 63 per cent of them reported syphilis in 1936. Some of this improvement may be due to the fact that those physicians who have constantly failed to report syphilis were advised that they would not be supplied with arsenicals unless they did report.

Study of the new arsenical, Mapharsen, is being continued but, although many favorable and but few unfavorable reports of this drug have appeared in the literature, the Department is not yet willing to accept it for general distribution. It is recommended, however, that since this new drug can be used quite successfully in the treatment of patients who cannot tolerate the standard arsenicals, it should be made available to experienced clinic chiefs for the treatment of those who cannot tolerate standard arsenicals.

Bismuth.—Under Social Security appropriation it has been possible to supply all of the syphilis clinics in the State with bismuth as well as with arsenicals. After consultation with all of the clinic chiefs, it was decided to purchase bismuth salicylate in olive oil in 60 c.c. bottles. Most of the clinics have already ordered and received a six months' supply of this product. The feasibility of supplying bismuth salicylate in olive oil to physicians in smaller containers is being studied, as the low price of the product will make such distribution possible through funds still available for the purchase of bismuth. Up to the end of 1936 nearly 60,000 doses of bismuth salicylate in oil had been distributed to the clinics, at a cost of just under $300.

Laboratory.—The Wassermann Laboratory reported 151,544 blood and spinal fluid examinations (nearly 21,000 more than in 1935), and the Bacteriological

Laboratory reported 11,734 smears examined for gonorrhea, an increase of nearly 1,000 over 1935. The second evaluation of the several important serological tests used in the United States, this time as performed by others than their originators, disclosed that the Hinton test once more stands well up among the leaders in specificity and sensitivity. Thus, the Department's action in adopting the Hinton test nearly three years ago as the routine serological test for syphilis in the State Laboratory is still further supported.

Education and Information.—During the year, the staff lectured to 49 different groups, chiefly professional, such as, nurses, medical students, and physicians, some 5,226 persons attending these lectures. In addition many thousands of persons were reached by the Public Health Education Worker who, as full-time lecturer, jointly for this Department and the Massachusetts Society for Social Hygiene, is constantly in the field.

During the year, also, there were distributed 106,956 pieces of literature, as compared with about 72,000 pieces last year. During the last eight years the Department has distributed approximately one million copies of between fifty and sixty pieces of literature. More than thirty of these have been for the information of physicians; between fifteen and twenty for the information of health officers, nurses and others in the field of public health; and some eight or ten have been for the information of the patient and the public.

Since the appearance of Surgeon General Thomas Parran's article in the Reader's Digest in July, 1936, newspapers throughout Massachusetts discarded their policy of remaining silent so far as syphilis and gonorrhea are concerned. Both syphilis and gonorrhea have been given frequent editorial mention, and a number of papers have carried a series of articles on the subject.

Training of Personnel.—The Simmons College School of Nursing organized its first summer session for the study of gonorrhea and syphilis, this year, under the direction of the Assistant Director who, together with Miss Crain, gave the majority of lectures in this course.

United States Public Health Service.—In December, Surgeon General Thomas Parran called a conference in Washington of nearly a thousand health officers, physicians, nurses, and social workers for a three-day discussion of programs for the control of syphilis and gonorrhea. It was possible through the use of Social Security funds, with the approval of the United States Public Health Service, to permit one or more representatives of all of the syphilis and gonorrhea clinics to attend this conference. Some twenty-seven clinic representatives, together with the Commissioner of Public Health and the Assistant Director, and two Epidemiologists attended the conference. The Assistant Director, Dr. Nelson, and Miss Gladys Crain, R.N., Epidemiologist, were invited by the United States Public Health Service to take part in the program, Dr. Nelson as chairman of the section on the control of gonorrhea and Miss Crain in the section on follow-up procedures.

Legislation.—The Legislature provided, through Chapter 115 of the Acts of 1936, that a prophylactic remedy for the prevention of gonococcal ophthalmia neonatorum should be used in the eyes of every baby at birth and that no such remedy may be used after June 4, 1936, which is not furnished or approved by the Department of Public Health. Upon the passage of this legislation the Department conferred with a group of recognized ophthalmologists, obstetricians, bacteriologists, pharmacists, and chemists, and upon the recommendations of that group, gave approval only to a one per cent filtered solution of silver nitrate, U.S.P., in distilled water, stored in ampoules for single use, and made further provisions as to the composition of the ampoules and expiration date of the solution. Notice of this action of the Department was sent to all physicians, maternity hospitals, boards of health, and nursing associations in the State.

Outbreaks of Vulvovaginitis.—The second outbreak within two years of vulvovaginitis in girl children occurred in the children's ward of a hospital in this State. As in the previous outbreak, it was finally concluded, after careful epidemiologic study, that the outbreak had been caused through the careless use of rectal thermometers.

Follow-up Service in Private Practice.—With the appointment of a public health nursing supervisor under the Social Security funds, it has been possible to resume the study of follow-up nursing service in private practice. This study has been

designed to evolve a plan of follow-up service for these patients comparable to that which exists for the clinic group, thus keeping these patients under adequate treatment without the necessity of reporting to official agencies.

Milk

Although during 1935 the State was free of any extensive outbreak of milk-borne typhoid, septic sore throat, or scarlet fever, there was a definite increase in the recognized incidence of milk-borne disease. This was due essentially to the better recognition of cases of undulant fever. Reference has already been made above to the two outbreaks in Pittsfield and North Adams respectively. Two cases developed in one family in Norton, also probably milk-borne. The majority of the sporadic cases were unquestionably due to the consumption of infected raw milk. In addition to these cases there was one case of typhoid probably spread through milk. This occurred in East Bridgewater and was in a person who purchased milk from a known typhoid carrier who, unbeknownst to the local board of health, bought a cow and started selling milk to a few of his neighbors. One case of typhoid that occurred shortly afterwards brought this situation to light. That such a condition can exist is due to the present statute that relieves a producer selling less than twenty quarts directly to consumers from the necessity of obtaining a milk license.

During the year the number of communities requiring the pasteurization or certification of all milk sold locally increased from twenty-five to thirty-one so that, as the year ends, such regulations are being enforced in the following communities: Ayer, Beverly, Boston, Braintree, Brookline, Cambridge, Chelsea, Dedham, Everett, Fall River, Framingham, Lexington, Lowell, Malden, Milton, Natick, New Bedford, Newton, Quincy, Revere, Salem, Somerville, Stoneham, Swampscott, Waltham, Watertown, Wellesley, Weston, Winchester, Winthrop, and Woburn. In addition, Pittsfield has adopted such a regulation to take effect January 1, 1937, Springfield the same regulation to take effect February 1, and Haverhill the same to take effect June 1, 1937. This means that, as the year ends, such regulations protect or, in the near future, will protect the milk supply of 2,350,000 people. It is probable that several other communities will adopt a similar regulation for enforcement in the near future, as experience shows that this is the only type of a regulation that affords any real guarantee against the spread of milk-borne disease.

District Health Officers

Coincidental with the development of the work in Franklin County and the broadening of the Berkshire Unit, a change was made in the assignment of a district health officer's duties in the western part of the State. In conformity with the statute permitting eight health districts, the territory formerly covered by Doctor Lee was divided into two parts with Doctor Lee concentrating on Franklin County and Doctor Stevens caring for all the Berkshire County. Simultaneously, a change was made in the district lines of the Worcester County District so that it now follows the county line along the western boundary.

No discussion of the work of the district health officers would be complete without reference to the loss of Dr. Harold E. Miner, who has served as district health officer in the southern Connecticut Valley since 1920. In addition to this territory he had at various times covered also Franklin County and the Berkshires. The true measure of Doctor Miner's service can never be made. The striking improvement in health conditions in Hampden and Hampshire Counties during the past fifteen years is in very large measure the reflection of his work. In his passing the Department loses one of its most valuable, trusted, and loyal members.

District Health Units

The past year has seen a steady growth not only in the size but in the influence of the Berkshire Health Unit with the addition of the towns of Hinsdale, Peru, and Washington. It seemed desirable to the Unit to change its name to that of the Berkshire Health Unit, thus looking forward to the ultimate time when it might be broadened to include all of the towns in Berkshire County. There is already much evidence of public interest in such a broadening of the scope of the Unit. This

would be a very logical outcome as the present town union is too uncertain a quantity to serve as a permanent administrative unit. A county unit paralleled after the Barnstable County Unit would give a certain stability that is now lacking in the Berkshires, and would at the same time reserve to the towns all the rights that they now possess as individual boards of health. In keeping with the idea of subsequent expansion, it was deemed desirable to appoint the director and supervising nurse of the Unit as the Department's district health officer and consultant nurse respectively in the Berkshire County communities not now members of the Berkshire Health District. This gives to them a contact with the non-member communities that was formerly missing and should serve to spread the idea of the advantages of the unit plan.

The past year has seen the first active financial participation of the towns in the Nashoba Area. This unit now comprises ten towns. Late in the year the Town of Pepperell voted to withdraw, but there is reason to believe that other towns may join in the near future. Definite interest has been evidenced in Berlin where a demonstration has been carried on during the latter half of the year. Renewed interest has similarly been evidenced in certain towns that did not join after the demonstration period. During the year the Commonwealth Fund, which formerly supported the district, has undertaken the erection of a building to serve as unit headquarters. This building should be ready for use shortly after the new year and may well serve to hold the member towns together. Unquestionably, however, even this unit will be less stable as a cooperative enterprise than were it on a county basis.

In Barnstable County the work of the county health unit has been reenforced through the addition of a complete milk laboratory, made possible under Social Security funds. This has been a weak spot in the Barnstable County program for several years. Additional nursing service was also made available so that we can look forward to a better rounded program in the future.

An attempt was made to organize a Franklin County Unit under local auspices. This plan met with such a lack of approval that only six towns voted to participate. All of these towns were so small that the total population affected was but 3,300. The opposition was apparently based upon an ungrounded fear that by forming such a unit the towns would sacrifice some of their present prerogatives. To this fear was coupled a sense of self-satisfaction in some communities and actual hostility to any sort of public health work in other communities. Finding it impossible to create a health district which would be governed locally, it was deemed wise to use Social Security funds to employ a district staff under state auspices who could serve as the agents of boards of health interested in utilizing their services. While this plan has been a forward step, it has failed so reach some of the communities most in need of better public health work. As the year closes, it is becoming increasingly apparent that the only solution for this area is to be in a State controlled unit which will offer direct services wherever possible regardless of official approval or disapproval of local boards of health. It would, thus, become merely a branch office of the Department, supplementing the present inadequate local programs wherever it is found that need for such supplementing existed.

Board of Health Records

The program of improving local board of health records, carried on for the past three years through the work of Miss Helen M. Smith, has been continued actively during the year. During the past year, Miss Smith has worked in the following communities: Belmont, Bridgewater, Brockton, Chicopee, Dartmouth, Fairhaven, Fall River, Franklin, Lowell, New Bedford, Newton, North Andover, Peabody, Plymouth, Springfield, Barnstable County Health Unit, Berkshire Health Unit, Franklin County District, and Nashoba Health Unit. In many instances, she has made return visits to check up on the improvements in the records as well as to undertake further studies. This work has yielded large returns in the general improvement of the record keeping system in many of the boards of health and has been of invaluable assistance in promoting a more systematic diphtheria immunization program in many of these communities. The work, which has been subsidized for the past three years by the Commonwealth Fund, will, fortunately, be continued under Social Security auspices.

Clinics and Dispensaries

The licensing of clinics and dispensaries, which is under the auspices of this Division, has continued without event during the past year. From time to time, certain clinics are found that have been operating for variable periods of time without a license owing to the fact that they were unaware of the law. Several of these have been found and brought under license during the past year. During 1936, 104 clinic licenses were issued. The principal problem that presents itself with these clinics is the maintenance of standards in a certain small group. The essential problem here is not the clinic itself, but rather the medical services offered therein. This goes back to the fundamental weakness in the medical registration law in the Commonwealth which was changed during the past session of the General Court. This change will be reflected very slowly in improving conditions of the clinics. Until such time as standards can be evolved which measure not only the physical equipment but also the quality of the medical services and the intent of the proprietors, it is unlikely that it will be possible to rectify the situation created by a certain small group of dispensaries.

Bacteriological Laboratory

During the past year there has been a slight increase in the number of specimens examined in the Bacteriological Laboratory, the total reaching a figure of 38,322 which is the largest number ever examined. There has been a decline in the number of specimens for diphtheria, tuberculosis, and typhoid due to the lowered incidence of these diseases. The increase in the pneumonia and gonorrhea specimens is probably a reflection of the increased attention given to these diseases. The twenty-four hour service that was instituted in 1935 has been continued throughout the year. On 121 occasions, bacteriologists were called into the laboratory during the evening for emergency specimens. Of these, 107 were for pneumonia typing and the remainder for miscellaneous purposes.

In order that the true work of this laboratory may be properly evaluated, it is desirable to record herewith the essential procedures carried on with respect to the most important tests:

Diphtheria.—The specimens are received on swabs which are inoculated on Leoffler's medium and, if appropriate, on blood agar plates. A direct smear is also made and examined for diphtheria bacilli and the organisms of Vincent's Angina. If the specimen was submitted for culture for diagnosis, examination by smear is made of the Loeffler's medium twice on the day the culture is received and again after twenty-four hours' incubation unless found positive earlier. Specimens submitted for release of the patient from quarantine are examined once only, at the end of twenty-four hours' growth. The blood agar plates are examined for hemolytic streptococci after twenty-four and forty-eight hours' incubation.

Tuberculosis.—All sputum specimens are examined by direct smear, at least five typical acid-fast bacilli being found before a positive report is made, and all smears subjected to fifteen minutes' study before being reported as negative. Specimens other than sputum are inoculated onto Petragnani's, Corper's and Pinner's media and examined weekly for at least six weeks. Acid-fast bacilli so cultured are inoculated into guinea pigs to confirm their pathogenicity.

Typhoid Fever.—Microscopic Widal tests are made routinely for typhoid and on request for paratyphoid A and B on direct blood specimens in a dilution of 1/50. If liquid blood is received, macroscopic slide tests are performed, using H and O typhoid and paratyphoid A and B antigens. All stool and urine specimens are inoculated on Endo's medium and Bismuth Sulfite Agar. Motile gram negative organisms are identified by fermentation reactions in individual carbohydrate broths and by agglutination tests.

Undulant Fever.—All specimens are examined by macroscopic tube agglutination tests. Tests are routinely performed through a dilution of 1/405 and those positive through this dilution are repeated for higher titer. Widals are routinely performed on all of these specimens. Blood cultures for Brucella abortus are incubated for three weeks under reduced oxygen tension.

Amoebic Dysentery.—Specimens for cysts are examined by direct smear and by culture using Loeffler's blood serum enriched with horse serum and rice starch.

Specimens from active cases, if fresh, are examined by direct smear and, if submitted fixed to cover slips, by Haidenhain's iron hematoxylin.

Gonorrhea.—Gram-stained smears are examined for the presence or absence of organisms resembling the gonococcus and for the number of leucocytes per high power field.

Pneumonia.—All sputa are examined for pneumococci of all of the Cooper types by the Neufeld technique. The first examination is with combinations of monovalent antisera (rabbit) and later with individual sera that constituted the mixture that yielded positive results. If the type cannot be determined by direct examination with the Neufeld technique, it is repeated after four to six hours' incubation of the sputum in modified Avery broth.

Spinal Fluid.—These specimens are examined by smears and cultures before and after centrifugation for tubercle bacilli, meningococci, streptococci, pneumococci, and Pfeiffer's (influenza) bacilli. Pneumococci, if present, are typed. If organisms resembling the Pfeiffer's bacillus are found, precipitin tests with specific antisera are made. Meningococci are identified through agglutination tests.

Reporting of Positive Findings.—In cases in which the proper immediate treatment or isolation of the patient depends upon the laboratory results, they are reported by telephone or telegraph at State expense. These include diagnostic diphtheria cultures, Type I and II pneumococcus typings, gonorrheal eye smears, meningococcus or Pfeiffer's bacillus spinal fluids, as well as Widals or stool specimens, if this is the first positive finding on the patient in question. All other specimens are reported by mail.

Public Health Education

Representatives of the Division gave 101 talks reaching 10,026 people. Three newspaper articles and 8 radio broadcasts were prepared.

Table I.—*Anterior Poliomyelitis*

Year	Cases	Case Rate per 100,000	Deaths	Death Rate per 100,000	Fatality Rate (Per Cent)
1932	61	1.4	13	0.3	21.3
1933	353	8.2	32	0.7	9.1
1934	76	1.8	9	0.2	11.8
1935	1,390	31.9	61	1.4	4.4
1936	51	1.2	8	0.2	15.7

Table II.—*Diphtheria*

1932	1,811	42.1	107	2.5	5.9
1933	1,041	24.1	86	2.0	8.3
1934	629	14.5	50	1.2	7.9
1935	390	8.9	26	0.6	6.7
1936	307	7.0	26	0.6	8.5

Table III.—*Gonorrhea*

1932	6,738	156.8	4	0.1	
1933	6,591	152.6	7	0.2	
1934	6,538	150.7	11	0.3	
1935	6,193	142.0	7	0.2	
1936	6,097	139.1	17	0.4	

Table IV.—*Lobar Pneumonia*

1932	4,028	93.7	1,688	39.3	41.9
1933	4,277	99.0	1,825	42.3	42.7
1934	3,976	91.6	1,601	36.9	40.3
1935	4,370	100.2	1,731	39.7	39.6
1936	5,460	124.6	1,933	44.1	35.4

TABLE V.—*Measles*

Year	Cases	Case Rate per 100,000	Deaths	Death Rate per 100,000	Fatality Rate (Per Cent)
1932	19,763	459.9	64	1.5	0.3
1933	15,067	348.9	27	0.6	0.2
1934	44,817	1,032.6	91	2.1	0.2
1935	12,352	283.2	37	0.8	0.3
1936	28,111	641.4	35	0.8	0.1

TABLE VI.—*Meningococcus Meningitis*

1932	83	1.9	34	0.8	41.0
1933	50	1.2	25	0.6	50.0
1934	66	1.5	28	0.6	42.4
1935	83	1.9	55	1.3	66.3
1936	191	4.4	100	2.3	52.4

TABLE VII.—*Scarlet Fever*

1932	16,580	385.8	145	3.4	0.9
1933	12,284	284.4	108	2.5	0.9
1934	8,391	193.3	76	1.8	0.9
1935	8,304	190.4	57	1.3	0.7
1936	8,774	200.2	44	1.0	0.5

TABLE VIII.—*Smallpox*

1932	43	1.0	–	–	–
1933	–	–	–	–	–
1934	–	–	–	–	–
1935	–	–	–	–	–
1936	–	–	–	–	–

TABLE IX.—*Syphilis*

1932	4,530	105.4	162	3.8
1933	4,466	103.4	154	3.6
1934	4,471	103.0	159	3.7
1935	5,317	121.9	177	4.1
1936	5,524	126.0	194	4.4

TABLE X.—*Tuberculosis, Pulmonary*

1932	3,994	92.9	2,041	47.5
1933	3,541	82.0	2,059	47.7
1934	3,585	82.6	1,902	43.8
1935	3,592	82.4	1,813	41.6
1936	3,209	73.2	1,726	39.4

TABLE XI.—*Tuberculosis, Non-Pulmonary*

1932	466	10.8	260	6.0
1933	466	10.8	222	5.1
1934	448	10.3	214	4.9
1935	387	8.9	148	3.4
1936	401	9.1	164	3.7

TABLE XII.—*Typhoid Fever*

1932	214	5.0	25	0.6	11.7
1933	162	3.8	22	0.5	13.6
1934	134	3.1	13	0.3	9.7
1935	112	2.6	10	0.2	8.9
1936	135	3.1	10	0.2	7.4

TABLE XIII.—*Whooping Cough*

1932	7,881	183.4	107	2.5	1.4
1933	9,834	227.7	97	2.2	1.0
1934	12,659	291.7	125	2.9	1.0
1935	5,566	127.6	67	1.5	1.2
1936	7,219	164.7	53	1.2	0.7

TABLE XIV.—*General Paralysis of the Insane*

Year	Deaths		First Admissions to State Institutions for Mental Diseases		
	Deaths	Death Rate per 100,000	First Admissions	Rate per 100,000	Per Cent of All First Admissions
1932	166	3.9	206	4.8	6.6
1933	147	3.4	209	4.8	6.5
1934	161	3.7	226	5.2	6.9
1935	128	2.9	281	6.4	4.9
1936	102	2.3	234	5.4	3.9

TABLE XV.—*Gonorrhea and Syphilis Treated in Clinics and Institutions*

*Clinics**

Year	New Cases		Visits	Number of Clinics
	Gonorrhea	Syphilis		
1932	2,961	2,891	245,281	26
1933	3,085	3,061	262,061	26
1934	3,003	2,992	268,520	26
1935	2,717	2,968	272,887	26
1936	2,388	2,679	260,602	26

*Institutions**

Year	New Cases		Visits	Number of Clinics
	Gonorrhea	Syphilis		
1932	522	987	–	24
1933	464	946	–	24
1934	435	803	–	24
1935	557	1,062	–	24
1936	395	892	–	24

*From Monthly Reports.

TABLE XVI.—*Grams of Arsphenamine, Sulpharsphenamine and Neoarsphenamine Distributed*

Year	Arsphenamine	Sulpharsphenamine	Neoarsphenamine	Total
1932	8,681	8,394	27,815	44,890
1933	7,984	4,339	37,080	49,403
1934	8,037	4,453	42,407	54,897
1935	7,138	3,508	45,184	55,830
1936	6,895	2,905	43,714	53,514

TABLE XVII.—*Grams of Arsenicals Distributed to Clinics, Institutions and Physicians*

Year	*Clinics and Institutions*	*Physicians*		
	Grams	Grams	Per Cent of Total	Number of Physicians
1932	36,903	6,987	15.9	288
1933	41,549	7,854	15.9	342
1934	44,284	10,613	19.3	418
1935	43,000	12,830	23.0	489
1936	39,977	13,537	25.3	495

TABLE XVIII.—*Laboratory Examinations*—1936

	Positive	Negative	Total for 1936	Total for 1935
Diphtheria:				
Diagnosis	68	4,461	4,529	5,493
Release	324	722	1,046	837
Gonorrhea	2,346	9,368	11,714	10,741
Hemolytic streptococci	641	1,088	1,729	2,322
Malaria	5	57	62	53
Meningococci, Spinal fluid for	50	91	141	14
Pneumonia:				
Pneumococci found	–	–	901 }	1,665
Pneumococci not found	–	–	545 }	
Tuberculosis:				
Sputum	741	4,550	5,291	5,484
Urine, spinal fluid, etc. (Culture and animal inoculations)	30	310	340	289
Typhoid fever:				
Widal	169	3,128	3,429*	2,866†
Culture (blood, feces, urine, etc.)	197	5,569	5,766	6,378
Undulant fever	142	963	1,105	742
Miscellaneous:				
Diphtheria virulence tests	7	2	9	
Dysentery agglutination tests	–	60	60	
Dysentery, Amoebic	2	104	106	
Paratyphoid fever agglutination tests	–	452	452	
Vincent's angina (Sent by dentists)	442	148	590	
Weil-Felix reaction for typhus fever	2	54	56	
Unclassified	–	–	451	1,380
Total			38,322	38,264

*Includes 132 atypical.
†Includes 90 atypical.

TABLE XIX.—*Pneumococcus Type Differentiation*

Type	Number	Type	Number
I	189	XX	13
II	52	XXI	20
III	95	XXII	4
IV	32	XXIII	7
V	142	XXIV	1
VI (A and B)	33	XXV	3
VII	58	*XXVI	–
VIII	82	XXVII	2
IX	10	XXVIII	8
X	10	XXIX	3
XI	16	†XXX	–
XII	7	XXXI	6
XIII	8	XXXII	0
XIV	16	Group IV	7
XV	13	B. friedlander A	4
XVI	10	B. friedlander B	1
XVII	9	No pneumococci	545
XVIII	18		
XIX	22	Total	1,446

*Type XXVI combined with VI in VI (A and B).
†Type XXX rabbit serum not available.

TABLE XX.—*Laboratory Examinations for Rabies**

YEAR	POSITIVE		Negative	Total Animals Examined
	Dogs	Other Animals		
1932	125	6	130	265
1933	139	5	153	301
1934	242	9	234	497
1935	187	16	232	491
1936	105	4	224	335

*Wassermann Laboratory.

Cases and Deaths, with Case and Death Rates per 100,000 Population for Reportable Diseases During the Year 1936*

DISEASES	Cases	Case Rate per 100,000 Popualtion	Deaths	Death Rate per 100,000 Population	Fatality Rate (Per Cent)
Actinomycosis	2	–**	2	–**	100.0
Anterior Poliomyelitis	51	1.2	8	0.2	15.7
Anthrax	9	0.2	1	–**	11.1
Chicken Pox	10,092	230.3	5	0.1	–**
Diphtheria	307	7.0	27	0.6	8.8
Dog Bite	10,129	231.1	–	–	–
Dysentery, Amebic	3	0.1	1	–**	33.3
Dysentery, Bacillary	23	0.5	4	0.1	17.4
Encephalitis Lethargica	14	0.3	14	0.3	100.0
German Measles	4,180	95.4	1	–**	–**
Gonorrhea	6,097	139.1	17	.4	0.3
Hookworm	1	–**	–	–	–
Lobar Pneumonia	5,459	124.6	1,944	44.4	35.6
Malaria	13	0.3	–	–	–
Measles	28,111	641.4	35	0.8	0.1
Meningococcus Meningitis	191	4.4	100	2.3	52.4
Mumps	14,186	323.7	6	.1	–**
Ophthalmia Neonatorum	1,116	25.5	–	–	–
Paratyphoid Fever	7	0.2	1	–**	14.3
Pellagra	12	0.3	14	0.3	–***
Rabies	–	–	–	–	–
Scarlet Fever	8,774	200.2	44	1.0	0.5
Septic Sore Throat	156	3.6	43	1.0	27.6
Smallpox	–	–	–	–	–
Syphilis	5,524	126.0	196	4.5	3.5
Tetanus	20	0.5	15	0.3	75.0
Trachoma	27	0.6	–	–	–
Trichinosis	36	0.8	2	–**	5.6
Tuberculosis, Pulmonary	3,207	73.2	1,733	39.5	54.0
Tuberculosis, Other Forms	401	9.1	165	3.8	41.1
Tuberculosis, Hilum	548	12.5	–	–	–
Typhoid Fever	135	3.1	10	0.2	7.4
Typhus Fever	5	0.1	1	–**	20.0
Undulant Fever	55	1.3	4	0.1	7.3
Whooping Cough	7,219	164.7	52	1.2	0.7
Total	106,110	2,421.0	4,445	101.4	

*Population, 4,382,900.
**Less than .05.
***Inadequately reported.

Cases and Deaths for all Reportable Diseases by Months—1936

	Jan.		Feb.		Mar.		Apr.		May		June		July		Aug.		Sept.		Oct.		Nov.		Dec.		Total	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
Actinomycosis	–	–	1	1	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	1	–	–	–	–	2	2
Anterior Poliomyelitis	1	–	2	1	–	–	1	–	15	1	6	–	3	1	5	1	6	1	11	3	1	–	–	–	51	8
Anthrax	–	–	2	1	2	–	1	–	–	–	1	–	1	–	–	–	–	–	–	–	–	–	2	–	9	1
Chicken Pox	1893	–	1220	–	1137	–	895	–	877	2	893	–	312	–	118	1	75	–	330	–	949	1	1393	1	10092	5
Diphtheria	53	6	30	2	21	3	22	–	24	4	18	–	36	3	19	3	28	3	15	1	23	1	18	1	307	27
Dog Bite	588	–	503	–	677	–	890	–	1237	–	1330	–	1199	–	1063	–	862	–	718	–	565	–	497	–	10129	–
Dysentery, Amebic	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	1	–	–	–	–	1	–	1	–	3	1
Dysentery, Bacillary	5	1	–	–	–	–	–	–	3	–	8	–	–	–	1	2	1	1	4	–	1	–	–	–	23	4
Encephalitis Lethargica	–	2	1	–	2	2	2	2	–	2	2	2	–	1	1	1	2	2	–	–	1	–	3	–	14	14
German Measles	245	–	424	–	816	1	644	–	1043	–	684	–	101	–	45	–	32	–	38	–	45	–	63	–	4180	1
Gonorrhea	557	–	396	3	485	2	486	2	441	–	406	2	548	2	562	1	571	–	567	1	488	2	590	2	6097	17
Hookworm	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–
Leprosy	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Lobar Pneumonia	1012	341	799	279	768	283	551	225	423	147	340	98	214	63	126	35	151	42	227	105	291	120	557	206	5459	1944
Malaria	–	–	–	–	–	–	1	–	1	–	1	–	1	–	1	–	3	–	2	–	1	–	2	–	13	–
Measles	1629	3	2477	6	3975	5	5569	5	6104	6	4066	4	1282	1	230	–	105	2	254	–	414	1	2006	2	28111	35
Meningococcus Meningitis	17	10	23	16	39	22	28	10	27	15	15	7	6	4	6	–	4	3	6	2	8	5	12	6	191	100
Mumps	2101	1	2213	1	2477	1	2174	–	1889	2	1232	1	445	–	207	–	180	–	247	–	358	–	663	–	14186	6
Ophthalmia Neonatorum	85	–	66	–	121	–	113	–	98	–	101	–	77	–	88	–	99	–	81	–	91	–	96	–	1116	–
Paratyphoid Fever	–	–	–	–	1	–	–	–	1	–	–	–	–	–	1	1	1	–	1	–	1	–	1	–	7	1
Pellagra	–	1	2	2	2	2	–	2	–	–	–	1	3	2	1	2	1	1	1	1	1	–	1	–	12	14
Rabies	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Scarlet Fever	1302	3	1095	7	1307	6	1217	11	923	5	721	2	257	1	156	1	188	2	362	1	493	2	753	3	8774	44
Septic Sore Throat	17	5	17	5	28	7	29	7	17	3	16	–	7	2	5	2	2	3	6	5	6	4	6	–	156	43
Smallpox	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Syphilis	443	19	426	20	492	17	514	16	446	17	423	10	476	22	462	17	463	14	466	13	469	16	444	15	5524	196
Tetanus	1	1	–	–	–	–	1	2	–	–	6	3	3	1	1	1	4	4	1	1	2	–	1	2	20	15
Trachoma	2	–	2	–	3	–	1	–	1	–	5	–	2	–	5	–	4	–	–	–	1	–	1	–	27	–
Trichinosis	2	–	2	–	4	–	1	–	–	1	1	–	1	–	5	–	3	1	4	–	8	–	5	–	36	2
Tuberculosis, Pulmonary	321	153	202	158	268	172	296	138	339	168	254	131	301	144	281	136	192	135	278	128	272	123	203	147	3207	1733
Tuberculosis, Other Forms	41	21	25	16	42	12	32	12	35	12	48	9	41	19	29	13	29	14	27	14	27	11	25	12	401	165
Tuberculosis, Hilum	38	–	43	–	47	–	53	–	78	–	46	–	39	–	35	–	24	–	43	–	68	–	34	–	548	–
Typhoid Fever	7	1	9	1	5	–	1	–	8	1	12	–	43	2	13	–	18	3	8	1	6	–	5	1	135	10
Typhus Fever	1	–	3	–	1	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	5	1
Undulant Fever	5	–	4	–	4	1	3	–	4	1	1	–	4	–	11	–	5	1	6	1	5	–	3	–	55	4
Whooping Cough	357	2	310	1	399	4	363	5	331	3	390	4	467	2	533	6	569	4	667	4	1095	5	1738	12	7219	52
Totals	10723	570	10279	520	13123	541	13890	437	14365	390	11027	274	5869	270	4010	224	3622	236	4370	232	5691	291	9123	410	106110	4445

Cases of Reportable Diseases by Ages for 1936

	Under 1 Year	1 year	2 years	3 years	4 years	5 years	6 years	7 years	8 years	9 years	10 to 14 years	15 to 19 years	20 to 24 years	25 to 29 years	30 to 34 years	35 to 44 years	45 to 54 years	55 to 64 years	65 to 74 years	75 years and over	Age Unknown	Total	Male	Female	Unknown
Anterior Poliomyelitis	1	3	5	1	3	–	2	3	1	–	12	16	3	1	–	–	–	–	–	–	–	51	31	20	–
Chicken Pox	282	414	535	638	789	1193	1861	1372	849	501	894	171	73	38	33	27	8	3	–	1	410	10092	5136	4890	66
Diphtheria	1	14	18	31	24	19	26	19	12	17	34	17	10	14	15	13	8	5	1	–	9	307	141	166	–
Dysentery, Amebic	–	–	–	–	–	–	–	–	–	–	–	1	–	–	1	1	–	–	–	–	–	3	2	1	–
Dysentery, Bacillary	1	1	1	1	–	1	2	1	1	1	2	2	1	–	2	2	–	1	1	–	2	23	12	11	–
German Measles	86	149	134	118	137	193	370	383	330	304	1081	369	159	55	23	33	15	1	3	–	237	4180	1908	2235	37
Gonorrhea	42	4	10	17	16	14	17	12	29	8	53	527	1768	1414	827	861	300	72	21	3	82	6097	4587	1510	–
Leprosy	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Lobar Pneumonia	130	168	136	106	136	131	176	134	102	74	334	277	220	248	266	637	651	630	451	245	207	5459	3266	2173	20
Malaria	–	–	–	–	–	–	–	1	–	–	–	–	–	1	3	3	3	2	–	–	–	13	7	6	–
Measles	527	1181	1498	1864	2431	3403	4977	4089	2445	1249	2470	443	138	99	66	75	20	7	5	–	1124	28111	14008	14052	51
Meningococcus Meningitis	9	4	7	3	–	6	3	2	2	–	9	22	20	12	14	18	26	14	5	3	12	191	143	48	–
Mumps	42	133	311	453	641	1131	2070	1878	1571	1081	2675	646	221	185	160	183	72	28	6	10	689	14186	7490	6606	90
Paratyphoid Fever	1	–	–	–	–	–	–	–	–	1	–	1	–	–	–	2	–	1	1	–	–	7	4	3	–
Pellagra	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	2	4	2	2	–	1	12	8	4	–
Scarlet Fever	43	160	384	615	703	873	997	797	667	488	1596	487	235	169	107	132	40	9	1	1	270	8774	4404	4310	60
Septic Sore Throat	–	1	–	2	4	3	3	2	2	5	9	11	25	18	10	18	17	11	3	1	11	156	56	100	–
Smallpox	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Syphilis	19	8	3	4	3	7	11	6	7	9	54	159	575	655	603	1278	1111	695	231	42	44	5524	3153	2371	–
Trachoma	–	–	–	–	–	–	–	–	–	1	2	3	2	1	–	4	5	5	1	–	3	27	14	13	–
Tuberculosis, Pulmonary	5	6	5	7	6	9	10	6	10	6	90	254	344	347	292	519	459	314	128	47	343	3207	1769	1438	–
Tuberculosis, Other Forms	9	7	17	9	6	4	3	4	8	2	32	25	44	38	34	51	32	30	14	6	26	401	193	208	–
Typhoid Fever	–	2	–	3	1	4	2	6	3	7	29	14	9	14	12	11	11	7	–	–	–	135	58	77	–
Typhus Fever	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	3	1	–	–	–	5	3	2	–
Undulant Fever	–	–	–	–	–	–	–	–	–	–	2	–	6	5	6	14	13	5	2	2	–	55	45	10	–
Whooping Cough	538	670	723	770	865	938	1067	615	305	138	214	31	13	13	15	11	4	2	–	–	287	7219	3537	3595	87

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Pelham . . . 311
Pembroke . . . 234
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Provincetown	141
Quincy	12
Randolph	90
Raynham	202
Reading	71
Rehoboth	172
Revere	30
Richmond	303
Rochester	265
Rockland	88
Rockport	151
Rowe	337
Rowley	247
Royalston	291
Russell	260
Rutland	194
Salem	22
Salisbury	201
Sandisfield	313
Sandwich	246
Saugus	56
Savoy	335
Scituate	144
Seekonk	127
Sharon	149
Sheffield	226
Shelburne	236
Sherborn	275
Shirley	181
Shrewsbury	100
Shutesbury	343
Somerset	121
Somerville	10
South Hadley	106
Southampton	282
Southborough	211
Southbridge	51
Southwick	243
Spencer	113
Springfield	4
Sterling	242
Stockbridge	220
Stoneham	69
Stoughton	84
Stow	267
Sturbridge	222
Sudbury	229
Sunderland	268
Sutton	186
Swampscott	76
Swansea	131
Taunton	28
Templeton	134
Tewksbury	105
Tewksbury State Infirmary	357
Tisbury	224
Tolland	352
Topsfield	270
Townsend	217
Truro	309
Tyngsboro	258
Tyringham	344
Upton	205
Uxbridge	115
Wakefield	50
Wales	328
Walpole	98
Waltham	26
Ware	92
Wareham	118
Warren	152
Warwick	305
Washington	338
Watertown	29
Wayland	155
Webster	61
Wellesley	62
Wellfleet	279
Wendell	327
Wenham	266
West Boylston	209
West Bridgewater	158
West Brookfield	263
West Newbury	250
West Springfield	48
West Stockbridge	272
West Tisbury	336
Westborough	120
Westfield	46
Westford	148
Westhampton	326
Westminster	219
Weston	145
Westport	137
Westwood	179
Weymouth	39
Whately	273
Whitman	96
Wilbraham	166
Williamsburg	227
Williamstown	133
Wilmington	129
Winchendon	108
Winchester	63
Windsor	325
Winthrop	49
Woburn	44
Worcester	3
Worthington	310
Wrentham	136
Yarmouth	206

Line No.	Cities and Towns in Order of Population	Population estimated as of July 1, 1936	Anterior Poliomyelitis		Chicken Pox		Diphtheria		Dog Bite		German Measles		Gonorrhea	
			Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
1	Massachusetts	4,382,900	51	**8**	10092	**5**	307	**27**	10129	–	4180	**1**	6097	**17**
	Cities of over 500,000													
2	Boston	829,250	–	–	2875	**2**	86	**5**	3003	–	594	–	2328	**5**
	Cities of over 150,000													
3	Worcester	188,981	3	–	420	–	14	–	524	–	116	–	188	–
	Cities of 100,000–150,000	*696,913*	*12*	*4*	*1446*	–	*89*	*13*	*1628*	–	*1315*	–	*1153*	*6*
4	Springfield	149,560	–	–	307	–	–	–	294	–	21	–	345	**2**
5	Cambridge	119,475	2	–	514	–	3	–	580	–	66	–	224	**1**
6	Fall River	118,091	–	–	168	–	19	**2**	129	–	778	–	115	**2**
7	New Bedford	109,230	6	**2**	67	–	15	**1**	61	–	39	–	147	**1**
8	Lynn	100,472	–	–	354	–	10	**2**	365	–	395	–	133	–
9	Lowell	100,085	4	**2**	36	–	42	**8**	199	–	16	–	189	–
	Cities and Towns of 50,000–100,000	*620,271*	*2*	–	*1210*	–	*15*	–	*1385*	–	*216*	–	*652*	*3*
10	Somerville	99,805	–	–	130	–	5	–	183	–	13	–	126	**1**
11	Lawrence	87,330	–	–	16	–	–	–	215	–	1	–	103	**1**
12	Quincy	78,464	1	–	340	–	1	–	151	–	27	–	57	–
13	Newton	66,417	–	–	165	–	1	–	178	–	32	–	51	–
14	Medford	61,990	–	–	256	–	3	–	220	–	22	–	75	–
15	Brockton	61,977	–	–	173	–	3	–	99	–	73	–	62	**1**
16	Malden	57,050	1	–	39	–	2	–	194	–	7	–	76	–
17	Holyoke	56,026	–	–	35	–	–	–	73	–	9	–	52	–
18	Brookline	51,212	–	–	56	–	–	–	72	–	32	–	50	–
	Cities and Towns of 25,000–50,000	*552,997*	*4*	*1*	*1080*	*2*	*53*	*5*	*1291*	–	*217*	–	*650*	–
19	Haverhill	49,770	–	–	110	–	2	–	109	–	26	–	131	–
20	Everett	46,858	1	–	28	–	2	–	86	–	18	–	63	–
21	Pittsfield	46,836	–	–	15	**1**	1	–	51	–	–	–	42	–
22	Salem	43,510	–	–	40	**1**	4	–	101	–	6	–	55	–
23	Fitchburg	42,018	–	–	44	–	5	**1**	25	–	4	–	40	–
24	Chelsea	41,680	1	–	62	–	4	**1**	135	–	14	–	52	–
25	Chicopee	41,334	–	–	39	–	18	**2**	55	–	2	–	31	–
26	Waltham	40,971	–	**1**	66	–	4	**1**	90	–	4	–	24	–
27	Arlington	39,311	–	–	289	–	1	–	121	–	39	–	22	–
28	Taunton	37,455	1	–	2	–	5	–	13	–	11	–	29	–
29	Watertown	36,115	1	–	81	–	–	–	145	–	29	–	37	–
30	Revere	35,214	–	–	57	–	4	–	133	–	47	–	77	–
31	Beverly	26,120	–	–	30	–	3	–	80	–	4	–	29	–
32	Belmont	25,805	–	–	217	–	–	–	147	–	13	–	18	–
	Cities and Towns of 10,000–25,000	*747,322*	*9*	–	*1788*	–	*16*	*2*	*1535*	–	*931*	–	*578*	*2*
33	Melrose	24,598	–	–	8	–	2	–	38	–	–	–	24	–
34	Northampton	24,570	1	–	123	–	–	–	46	–	21	–	36	–
35	Gloucester	24,152	–	–	22	–	1	–	77	–	3	–	10	–
36	Framingham	22,789	–	–	14	–	2	–	82	–	1	–	16	–
37	Peabody	22,314	–	–	42	–	–	–	32	–	1	–	29	–
38	North Adams	22,231	–	–	2	–	1	–	20	–	1	–	11	–
39	Weymouth	22,021	–	–	7	–	–	–	44	–	–	–	10	–
40	Leominster	21,921	–	–	47	–	–	–	48	–	3	–	11	**1**
41	Attleboro	21,856	3	–	47	–	–	–	62	–	101	–	7	–
42	Methuen	21,074	–	–	15	–	–	–	49	–	–	–	14	–
43	Gardner	20,712	–	–	4	–	–	–	30	–	5	–	18	–
44	Woburn	19,778	–	–	29	–	–	–	54	–	17	–	16	–
45	Milton	18,689	–	–	124	–	–	–	50	–	7	–	9	–
46	Westfield	18,482	–	–	11	–	–	–	32	–	1	–	19	–
47	Braintree	17,569	–	–	42	–	–	–	47	–	1	–	20	–
48	West Springfield	17,255	–	–	1	–	1	**1**	–	–	–	–	19	–
49	Winthrop	17,048	1	–	142	–	–	–	71	–	409	–	10	–
50	Wakefield	16,550	–	–	2	–	–	–	44	–	1	–	10	–
51	Southbridge	16,266	–	–	19	–	–	–	6	–	3	–	21	–
52	Greenfield	16,030	1	–	58	–	–	–	24	–	3	–	19	–
53	Marlborough	15,842	–	–	20	–	–	–	–	–	1	–	5	–
54	Norwood	15,739	–	–	7	–	–	–	4	–	2	–	14	–
55	Dedham	15,444	–	–	–	–	–	–	13	–	–	–	10	–
56	Saugus	15,194	–	–	5	–	–	–	25	–	1	–	12	–
57	Milford	15,092	1	–	–	–	–	–	2	–	20	–	18	–
58	Newburyport	14,734	–	–	30	–	–	–	17	–	2	–	11	–
59	Natick	14,648	–	–	112	–	1	–	62	–	16	–	23	–
60	Danvers	14,178	–	–	26	–	–	–	20	–	3	–	8	–
61	Webster	14,104	–	–	24	–	–	–	10	–	2	–	7	–
62	Wellesley	13,988	–	–	117	–	1	–	63	–	21	–	15	–
63	Winchester	13,576	–	–	166	–	–	–	75	–	13	–	14	–
64	Plymouth	13,228	–	–	39	–	–	–	23	–	19	–	11	–
65	Adams	12,909	1	–	–	–	–	–	5	–	–	–	7	–

Lobar Pneumonia		Measles		Menin. Meningitis		Mumps		Ophthalmia Neonatorum		Scarlet Fever		Syphilis		Tuberculosis, Pulmonary		Tuberculosis, Other Forms		Typhoid Fever		Whooping Cough		
Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Line No.
5459	1944	28111	35	191	100	14186	6	1116	–	8774	44	5524	196	3207	1733	401	165	135	10	7219	52	1
1713	479	7447	7	79	44	3701	–	656	–	2057	6	2299	50	936	497	116	37	15	–	3124	16	2
273	110	1471	–	7	7	785	–	36	–	463	2	172	10	164	82	12	6	1	–	672	2	3
916	*290*	*3400*	*4*	*12*	*9*	*2488*	*2*	*190*	–	*1071*	*3*	*897*	*51*	*537*	*298*	*66*	*33*	*61*	*5*	*991*	*8*	
229	69	53	–	2	2	654	1	66	–	165	–	228	7	78	38	10	6	2	–	260	2	4
223	58	1263	2	3	2	858	–	18	–	266	–	186	3	121	69	13	8	4	1	348	–	5
165	48	70	–	2	2	348	–	70	–	270	–	89	10	90	63	9	5	1	1	31	2	6
102	24	41	–	1	1	290	–	32	–	108	1	137	11	102	51	14	9	8	1	57	1	7
144	49	1249	1	4	1	334	1	3	–	125	2	151	12	73	35	14	3	7	1	288	2	8
53	42	724	1	–	1	4	–	1	–	137	–	106	8	73	42	6	2	39	1	7	1	9
712	*240*	*5871*	*7*	*15*	*10*	*1969*	–	*163*	–	*1292*	*6*	*617*	*21*	*420*	*177*	*62*	*24*	*13*	*1*	*716*	*11*	
189	42	493	2	4	1	283	–	6	–	209	1	135	5	91	38	18	5	1	–	112	4	10
49	31	14	–	–	–	37	–	1	–	35	1	123	4	62	23	11	2	5	–	41	5	11
43	27	1179	–	2	3	560	–	–	–	196	–	41	2	43	23	4	2	2	–	92	–	12
80	20	1887	1	2	2	403	–	3	–	117	–	50	–	34	13	4	5	2	1	23	–	13
68	23	349	2	1	–	286	–	7	–	155	1	50	3	32	19	4	3	1	–	127	1	14
97	31	739	2	3	1	147	–	140	–	91	–	77	2	38	14	4	1	–	–	106	–	15
73	27	233	–	2	3	134	–	3	–	142	–	70	2	40	15	5	2	1	–	77	–	16
74	19	18	–	1	–	8	–	1	–	271	3	25	1	47	22	4	3	–	–	43	1	17
39	20	959	–	–	–	111	–	2	–	76	–	46	2	33	10	8	1	1	–	95	–	18
698	*220*	*2917*	*2*	*11*	*5*	*1373*	–	*23*	–	*1157*	*9*	*577*	*16*	*342*	*186*	*59*	*23*	*12*	*1*	*645*	*4*	
47	15	238	–	–	–	19	–	3	–	122	–	71	1	29	14	6	–	1	–	57	–	19
78	25	232	–	2	2	77	–	3	–	117	1	95	3	38	16	11	4	1	–	78	1	20
36	18	62	–	–	–	17	–	–	–	127	2	49	1	19	4	3	3	3	1	14	–	21
76	24	77	–	–	–	18	–	3	–	27	1	31	–	17	10	5	2	1	–	–	–	22
38	22	122	1	3	–	49	–	2	–	66	1	26	1	28	15	2	1	–	–	44	1	23
79	21	286	–	2	–	53	–	3	–	86	–	66	1	43	23	6	3	1	–	56	–	24
63	17	3	–	–	–	12	–	3	–	46	–	16	–	37	22	4	1	1	–	20	2	25
30	7	423	1	1	–	59	–	–	–	109	2	36	4	27	27	4	2	2	–	53	–	26
46	15	615	–	1	1	240	–	2	–	67	–	42	2	13	9	7	2	–	–	125	–	27
16	15	9	–	–	–	10	–	–	–	25	–	23	1	19	17	5	3	–	–	–	–	28
26	10	167	–	–	–	365	–	1	–	62	–	31	1	24	15	2	1	–	–	49	–	29
79	16	64	–	–	–	30	–	–	–	153	–	53	1	22	6	2	–	1	–	34	–	30
59	11	381	–	–	–	9	–	1	–	60	–	20	–	16	4	–	–	1	–	2	–	31
25	4	238	–	2	2	415	–	2	–	90	2	18	–	10	4	2	1	–	–	113	–	32
642	*271*	*3706*	*9*	*25*	*13*	*1591*	*2*	*37*	–	*1363*	*7*	*507*	*23*	*411*	*191*	*49*	*16*	*14*	*1*	*549*	*3*	
42	7	91	–	–	–	29	–	8	–	25	–	9	3	7	4	1	–	2	–	10	–	33
27	5	96	–	–	–	19	–	1	–	94	–	31	4	17	14	–	1	–	–	18	–	34
32	13	121	1	–	–	41	–	–	–	14	1	22	1	19	5	1	2	–	–	16	–	35
58	16	25	–	1	–	16	–	1	–	43	–	21	1	9	6	1	–	–	–	22	–	36
12	5	75	–	–	–	33	–	–	–	37	–	17	1	19	5	–	–	–	–	–	–	37
22	10	32	–	–	–	3	–	1	–	9	–	25	–	4	3	–	1	–	–	3	1	38
5	4	81	–	1	–	5	–	1	–	32	–	11	1	14	5	3	2	–	–	4	–	39
23	8	181	2	2	2	69	1	3	–	30	–	27	–	18	6	2	–	–	–	4	–	40
21	12	18	–	–	–	18	–	3	–	20	–	17	–	12	7	2	2	5	–	–	–	41
6	4	9	–	–	–	57	–	–	–	12	–	13	–	10	3	2	–	–	–	48	–	42
25	9	30	1	1	1	11	–	2	–	14	–	12	–	21	5	6	–	–	–	8	1	43
15	7	85	–	–	–	3	–	1	–	82	–	12	1	9	1	2	–	–	–	–	–	44
14	9	316	–	–	–	47	–	–	–	67	–	10	–	8	1	2	1	–	–	24	–	45
40	7	5	–	1	–	2	–	1	–	59	–	5	1	20	10	1	–	–	–	2	–	46
2	1	150	1	–	–	3	–	–	–	17	1	12	–	10	11	–	1	–	–	8	–	47
19	6	–	–	1	–	1	–	–	–	41	–	18	–	2	2	–	1	1	–	–	–	48
9	3	43	–	1	1	25	–	–	–	64	–	7	2	10	4	3	1	–	–	18	–	49
9	6	20	–	–	–	17	–	–	–	23	–	7	–	4	2	1	–	–	–	2	–	50
14	4	101	1	–	–	8	–	3	–	8	–	12	–	9	3	–	–	–	–	8	–	51
22	9	26	–	1	–	80	–	–	–	17	–	13	1	6	4	–	–	–	–	61	–	52
8	5	17	–	–	–	140	–	–	–	8	–	11	1	4	3	2	1	–	–	3	–	53
6	3	45	1	–	–	–	–	–	–	19	1	8	–	11	4	–	–	2	–	–	–	54
10	6	82	–	–	–	1	–	–	–	14	–	8	–	11	6	1	–	–	–	–	–	55
14	6	41	–	1	1	15	–	–	–	17	–	20	–	6	3	–	–	1	–	8	–	56
7	12	3	–	–	–	5	–	–	–	6	–	6	–	1	8	1	–	–	–	–	–	57
12	6	198	–	1	–	120	–	–	–	7	–	14	1	12	2	1	–	1	–	–	–	58
17	8	91	–	2	2	105	–	–	–	104	–	10	–	6	3	5	–	–	–	33	–	59
6	6	26	–	–	–	9	–	–	–	3	–	14	1	15	10	2	–	–	–	1	–	60
5	6	305	–	2	1	5	–	–	–	22	–	5	–	3	3	–	–	–	–	–	–	61
10	5	721	–	–	–	138	–	–	–	27	–	4	–	4	1	–	–	–	–	19	–	62
11	7	87	–	1	1	113	–	–	–	20	–	9	–	8	1	–	–	–	–	21	–	63
1	2	24	–	–	–	15	1	–	–	69	2	11	–	9	5	2	–	–	–	2	–	64
6	4	–	–	–	–	2	–	–	–	27	–	7	1	7	5	1	–	–	–	3	–	65

Cases and Deaths from Diseases

Line No.	Cities and Towns in Order of Population	Population estimated as of July 1, 1936	Anterior Poliomyelitis		Chicken Pox		Diphtheria		Dog Bite		German Measles		Gonorrhea	
			Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
66	Clinton	12,236	–	–	6	–	–	–	17	–	–	–	2	–
67	Needham	12,137	–	–	103	–	–	–	34	–	10	–	5	–
68	Lexington	11,238	–	–	56	–	1	–	25	–	18	–	6	–
69	Stoneham	11,087	–	–	8	–	1	–	36	–	1	–	4	–
70	Fairhaven	11,021	–	–	34	–	1	–	38	–	72	–	5	–
71	Reading	10,998	1	–	15	–	–	–	7	–	1	–	15	–
72	Northbridge	10,849	–	–	–	–	–	–	–	–	–	–	2	–
73	Athol	10,775	–	–	4	–	1	–	11	–	1	–	11	–
74	Andover	10,724	–	–	9	–	–	–	44	–	5	–	1	–
75	Marblehead	10,648	–	–	10	–	1	–	65	–	9	–	16	–
76	Swampscott	10,522	–	–	174	–	1	–	55	–	134	–	5	–
77	Easthampton	10,224	–	–	11	–	–	–	4	–	1	–	3	–
78	North Attleborough	10,204	–	–	5	–	1	1	–	–	–	–	8	–
79	Amesbury	10,078	–	–	48	–	–	–	24	–	1	–	11	1
	Cities and Towns of 5,000–10,000	*341,111*	*4*	*1*	*362*	–	*15*	*1*	*364*	–	*368*	*1*	*281*	–
80	Dartmouth	9,628	–	–	18	–	–	–	17	–	7	–	7	–
81	Palmer	9,395	–	–	5	–	–	–	2	–	3	–	9	–
82	Bridgewater	9,248	–	–	26	–	2	–	17	–	8	–	11	–
83	Middleborough	8,946	–	–	13	–	–	–	13	–	104	1	6	–
84	Stoughton	8,565	–	–	2	–	1	–	3	–	–	–	3	–
85	Hudson	8,502	–	–	–	–	–	–	–	–	–	–	–	–
86	Ludlow	8,475	–	–	–	–	–	–	–	–	–	–	8	–
87	Barnstable	8,280	–	–	17	–	–	–	35	–	8	–	12	–
88	Rockland	8,005	–	–	1	–	–	–	–	–	–	–	5	–
89	Montague	7,931	–	–	1	–	1	–	3	–	1	–	5	–
90	Randolph	7,904	–	–	–	–	1	–	–	–	–	–	9	–
91	Grafton	7,886	–	–	2	–	–	–	–	–	1	–	6	–
92	Ware	7,835	–	–	–	–	–	–	1	–	–	–	4	–
93	Concord	7,801	–	–	12	–	–	–	13	–	3	–	4	–
94	Chelmsford	7,775	–	–	20	–	1	–	10	–	1	–	3	–
95	Franklin	7,641	–	–	–	–	–	–	22	–	55	–	7	–
96	Whitman	7,596	–	–	1	–	–	–	–	–	–	–	8	–
97	Hingham	7,542	–	–	9	–	–	–	22	–	2	–	8	–
98	Walpole	7,505	–	–	1	–	–	–	4	–	2	–	3	–
99	North Andover	7,229	2	–	37	–	–	–	21	–	–	–	3	–
100	Shrewsbury	7,217	–	–	9	–	–	–	–	–	1	–	4	–
101	Maynard	7,095	–	–	–	–	–	–	–	–	–	–	9	–
102	Falmouth	7,079	–	–	12	–	–	–	40	–	19	–	19	–
103	Agawam	7,040	–	–	–	–	–	–	–	–	–	–	16	–
104	Billerica	6,893	1	1	–	–	–	–	2	–	–	–	6	–
105	Tewksbury	6,871	–	–	–	–	–	–	9	–	1	–	11	–
106	South Hadley	6,857	–	–	–	–	–	–	1	–	–	–	2	–
107	Millbury	6,855	–	–	46	–	1	–	6	–	7	–	2	–
108	Winchendon	6,731	–	–	11	–	–	–	1	–	5	–	1	–
109	Canton	6,723	–	–	4	–	2	–	23	–	–	–	2	–
110	Amherst	6,659	–	–	25	–	–	–	19	–	6	–	7	–
111	Auburn	6,658	–	–	–	–	–	–	4	–	1	–	3	–
112	Mansfield	6,599	–	–	15	–	–	–	14	–	4	–	2	–
113	Spencer	6,556	–	–	2	–	–	–	7	–	–	–	4	–
114	Great Barrington	6,506	–	–	18	–	–	–	9	–	2	–	9	–
115	Uxbridge	6,433	–	–	18	–	–	–	9	–	117	–	5	–
116	Ipswich	6,412	1	–	1	–	–	–	2	–	–	–	7	–
117	Dracut	6,374	–	–	–	–	1	1	2	–	–	–	7	–
118	Wareham	6,161	–	–	2	–	1	–	7	–	–	–	14	–
119	Foxborough	5,987	–	–	13	–	–	–	–	–	3	–	4	–
120	Westborough	5,969	–	–	–	–	3	–	3	–	–	–	11	–
121	Somerset	5,737	–	–	5	–	1	–	–	–	2	–	1	–
122	Abington	5,643	–	–	–	–	–	–	–	–	–	–	4	–
123	Orange	5,389	–	–	–	–	–	–	1	–	–	–	1	–
124	Longmeadow	5,315	–	–	14	–	–	–	8	–	3	–	2	–
125	Easton	5,293	–	–	2	–	–	–	8	–	–	–	2	–
126	Monson	5,280	–	–	–	–	–	–	–	–	–	–	–	–
127	Seekonk	5,090	–	–	–	–	–	–	6	–	2	–	5	–
	Towns of 2,500–5,000	*200,489*	*3*	*1*	*309*	*1*	*7*	*1*	*218*	–	*175*	–	*122*	–
128	Dudley	4,664	–	–	–	–	–	–	1	–	–	–	–	–
129	Wilmington	4,644	–	–	4	–	1	–	10	–	1	–	3	–
130	Blackstone	4,562	–	–	–	–	–	–	–	–	–	–	–	–
131	Swansea	4,450	–	–	–	–	–	–	–	–	–	–	–	–
132	Leicester	4,421	–	–	–	–	–	–	–	–	–	–	2	–
133	Williamstown	4,389	–	–	–	–	–	–	–	–	–	–	5	–
134	Templeton	4,347	–	–	–	–	–	–	–	–	–	–	2	–
135	Oxford	4,346	–	–	2	–	–	–	6	–	6	–	2	–
136	Wrentham	4,342	–	–	9	–	–	–	5	–	–	–	8	–
137	Westport	4,339	–	–	–	–	–	–	4	–	16	–	1	–
138	Dalton	4,300	–	–	–	–	–	–	–	–	–	–	1	–

Dangerous to the Public Health, 1936 — Continued

Lobar Pneumonia		Measles		Menin. Meningitis		Mumps		Ophthalmia Neonatorum		Scarlet Fever		Syphilis		Tuberculosis, Pulmonary		Tuberculosis, Other Forms		Typhoid Fever		Whooping Cough		
Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Line No.
9	1	22	–	–	–	8	–	–	–	8	–	5	1	3	4	1	–	–	–	–	–	66
10	4	33	–	–	–	24	–	1	–	33	–	5	–	6	–	1	–	–	–	13	–	67
12	4	54	–	–	–	46	–	1	–	55	–	6	–	25	8	1	–	–	–	57	–	68
5	2	40	–	1	1	13	–	2	–	13	–	9	–	1	4	–	–	–	–	12	–	69
5	3	39	–	–	–	162	–	2	–	17	–	4	1	10	5	1	1	1	1	5	–	70
9	1	3	–	–	–	5	–	–	–	57	1	8	1	8	3	–	1	–	–	1	–	71
8	9	–	–	1	1	–	–	–	–	8	–	1	–	3	1	–	–	–	–	–	–	72
8	4	141	1	1	–	37	–	–	–	6	–	5	–	5	3	1	–	–	–	16	–	73
8	5	48	–	1	–	52	–	–	–	11	–	6	–	5	1	–	–	–	–	40	1	74
9	2	64	–	1	–	11	–	–	–	41	1	3	–	3	1	1	1	–	–	21	–	75
8	4	59	–	–	–	75	–	6	–	44	–	6	–	2	1	1	–	–	–	38	–	76
18	4	53	1	3	1	2	–	–	–	12	–	4	–	9	1	–	–	–	–	–	–	77
1	3	1	–	1	1	–	–	–	–	1	–	4	–	3	3	–	–	–	–	–	–	78
2	4	4	–	–	–	1	–	–	–	5	–	13	–	3	1	–	–	1	–	–	–	79
250	*143*	*1591*	*1*	*25*	*5*	*855*	*2*	*7*	–	*601*	*6*	*216*	*11*	*160*	*109*	*17*	*8*	*10*	*1*	*275*	*2*	
13	7	14	–	–	–	141	–	–	–	3	–	3	–	11	8	3	1	2	–	2	–	80
2	4	2	–	–	–	10	–	–	–	39	2	6	1	4	1	1	1	–	–	3	–	81
15	3	111	–	14	1	255	–	1	–	3	–	6	–	12	6	–	–	–	–	10	–	82
3	4	15	–	–	–	15	–	–	–	17	–	5	–	2	–	1	–	–	–	32	–	83
7	6	18	–	–	–	11	–	–	–	8	–	5	1	10	2	2	–	–	–	7	–	84
1	3	–	–	–	–	–	1	–	–	9	–	4	–	1	–	1	–	–	–	–	–	85
–	2	–	–	–	–	46	–	–	–	16	–	9	–	7	4	–	–	–	–	1	–	86
5	4	10	–	–	–	5	–	–	–	30	–	9	1	3	–	–	–	–	–	2	–	87
14	2	1	–	1	1	–	–	–	–	17	–	6	1	3	2	–	–	–	–	–	–	88
–	1	11	–	1	–	–	–	–	–	1	–	2	–	1	2	–	–	–	–	6	–	89
1	3	–	–	–	–	–	–	–	–	4	–	6	–	–	5	–	–	1	–	–	–	90
1	1	–	–	–	–	–	–	–	–	5	–	4	–	1	4	–	–	1	–	3	–	91
–	6	15	–	–	–	1	–	–	–	2	–	2	–	–	5	–	2	–	–	–	–	92
2	–	99	–	–	–	23	–	–	–	18	–	3	–	5	1	–	–	1	–	14	–	93
1	2	140	–	–	–	7	1	–	–	59	–	1	1	4	4	–	–	–	–	–	–	94
7	2	29	–	–	–	4	–	–	–	34	1	17	–	4	3	–	–	–	–	1	–	95
4	7	46	–	1	1	1	–	–	–	2	–	3	–	8	–	–	–	–	1	–	–	96
11	5	35	–	–	–	16	–	2	–	13	–	5	–	4	2	4	–	1	–	25	–	97
6	2	25	1	–	–	9	–	–	–	5	–	3	–	6	2	–	–	–	–	2	–	98
2	2	1	–	–	–	16	–	–	–	3	–	2	1	3	1	–	–	–	–	11	–	99
4	1	28	–	–	–	2	–	–	–	8	1	–	–	–	2	–	–	–	–	–	–	100
1	4	24	–	–	–	9	–	–	–	8	–	3	–	4	3	–	–	–	–	–	–	101
21	6	9	–	1	–	15	–	–	–	7	–	3	–	11	3	–	1	–	–	3	–	102
6	5	2	–	–	–	–	–	–	–	13	–	3	–	–	3	1	–	1	–	1	–	103
7	3	7	–	–	–	–	–	–	–	20	–	5	–	1	2	–	1	1	–	–	–	104
1	1	4	–	–	–	–	–	–	–	–	–	11	–	1	2	–	–	–	–	–	–	105
14	1	–	–	–	–	2	–	–	–	17	–	3	–	3	3	–	–	–	–	–	–	106
11	4	39	–	1	–	9	–	–	–	40	1	2	–	3	3	1	–	–	–	42	–	107
9	2	36	–	–	–	5	–	–	–	12	–	5	–	3	–	–	–	–	–	12	–	108
4	5	54	–	–	–	36	–	–	–	4	–	3	1	7	1	–	–	–	–	5	–	109
5	–	175	–	1	–	22	–	3	–	82	–	3	–	–	3	–	–	–	–	2	–	110
2	1	42	–	–	–	13	–	–	–	9	–	–	–	4	1	–	–	–	–	42	–	111
10	4	40	–	–	–	4	–	–	–	1	–	8	–	1	1	–	1	–	–	15	1	112
9	3	6	–	2	–	–	–	–	–	14	–	1	1	3	–	–	–	–	–	3	–	113
3	2	5	–	–	–	111	–	–	–	2	–	5	–	2	1	–	–	–	–	3	–	114
3	4	147	–	1	–	2	–	–	–	7	–	1	–	3	4	1	–	–	–	5	–	115
5	2	50	–	–	–	–	–	–	–	9	1	3	–	1	1	–	–	–	–	–	–	116
–	3	125	–	1	1	–	–	1	–	2	–	2	–	3	4	1	–	–	–	–	–	117
1	2	1	–	–	–	4	–	–	–	7	–	22	–	6	3	–	–	–	–	–	–	118
6	–	10	–	–	–	6	–	–	–	11	–	2	2	8	6	–	1	–	–	5	–	119
4	3	–	–	–	–	–	–	–	–	7	–	3	–	1	4	–	–	–	–	–	–	120
–	3	1	–	1	1	1	–	–	–	3	–	5	–	3	1	–	–	1	–	–	–	121
2	4	–	–	–	–	–	–	–	–	4	–	6	–	–	–	–	–	–	–	–	–	122
1	1	195	–	–	–	3	–	–	–	2	–	2	–	–	1	–	–	–	–	6	1	123
5	5	1	–	–	–	44	–	–	–	11	–	9	–	1	1	–	–	1	–	6	–	124
20	8	18	–	–	–	7	–	–	–	6	–	1	–	1	2	–	–	–	–	4	–	125
–	–	–	–	–	–	–	–	–	–	2	–	3	–	1	1	–	–	–	–	–	–	126
1	–	–	–	–	–	–	–	–	–	6	–	1	1	–	1	1	–	–	–	2	–	127
120	*99*	*884*	*2*	*9*	*4*	*729*	–	*2*	–	*353*	*4*	*121*	*3*	*97*	*79*	*10*	*8*	*5*	*1*	*108*	*4*	
2	–	6	–	–	–	–	–	–	–	2	1	3	–	4	1	–	–	–	–	–	–	128
2	1	13	–	–	–	4	–	–	–	8	–	5	1	1	1	–	–	–	–	5	–	129
–	4	–	–	–	–	–	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	130
–	2	–	–	–	–	–	–	–	–	–	–	–	–	1	2	–	–	–	–	–	–	131
2	4	–	–	–	–	3	–	–	–	–	–	2	–	1	3	–	1	–	–	–	–	132
2	–	2	–	–	–	2	–	–	–	–	–	5	–	5	2	–	–	–	–	–	1	133
1	7	–	–	–	–	–	–	–	–	–	–	3	–	–	2	–	–	–	–	–	–	134
4	2	46	–	–	–	63	–	–	–	6	–	5	–	3	1	–	–	–	–	3	–	135
4	–	1	–	1	1	1	–	–	–	3	–	4	–	–	3	–	–	–	–	–	–	136
3	2	1	–	–	–	1	–	1	–	2	–	1	–	1	2	–	–	–	–	–	–	137
2	3	–	1	–	–	–	–	–	–	11	–	2	–	3	–	–	–	–	–	–	–	138

Line No.	Cities and Towns in Order of Population	Population estimated as of July 1, 1936	Anterior Poliomyelitis		Chicken Pox		Diphtheria		Dog Bite		German Measles		Gonorrhea	
			Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
139	Lee	4,214	–	–	6	–	–	–	9	–	–	–	5	–
140	Medfield	4,192	–	–	–	–	–	–	1	–	6	–	2	–
141	Provincetown	4,154	–	–	13	–	–	–	3	–	–	–	2	–
142	Ayer	4,115	–	–	2	–	–	–	2	–	–	–	2	–
143	Belchertown	4,091	–	–	18	–	–	–	–	–	–	–	1	–
144	Scituate	4,077	–	–	10	–	–	–	–	–	–	–	8	–
145	Weston	4,010	–	–	25	–	–	–	18	–	–	–	3	–
146	Holden	3,926	–	–	17	–	–	–	5	–	39	–	–	–
147	Acushnet	3,906	–	–	3	–	–	–	1	–	2	–	3	–
148	Westford	3,849	–	–	–	–	1	–	–	–	1	–	1	–
149	Sharon	3,788	–	–	14	–	–	–	28	–	–	–	4	–
150	East Bridgewater	3,695	–	–	21	–	–	–	–	–	–	–	3	–
151	Rockport	3,635	–	–	12	–	–	–	23	–	–	–	2	–
152	Warren	3,629	–	–	–	–	–	–	1	–	–	–	1	–
153	Cohasset	3,524	–	–	2	–	–	–	5	–	–	–	1	–
154	Barre	3,509	–	–	6	–	1	1	–	–	–	–	–	–
155	Wayland	3,475	–	–	–	–	–	–	6	–	–	–	2	–
156	Bourne	3,474	–	–	1	–	1	–	–	–	1	–	5	–
157	Nantucket	3,442	–	–	1	–	–	–	21	–	–	–	1	–
158	West Bridgewater	3,403	–	–	11	–	1	–	3	–	4	–	1	–
159	East Longmeadow	3,390	–	–	22	–	–	–	1	–	–	–	3	–
160	Bedford	3,368	–	–	14	–	–	–	3	–	1	–	2	–
161	Holbrook	3,367	–	–	3	–	–	–	8	–	–	–	–	–
162	Medway	3,304	–	–	–	–	–	–	11	–	48	–	2	–
163	North Brookfield	3,240	2	1	–	–	–	–	1	–	–	–	4	–
164	Dighton	3,107	–	–	1	–	–	–	–	–	7	–	2	–
165	Hopedale	3,098	–	–	7	1	–	–	1	–	15	–	–	–
166	Wilbraham	3,048	1	–	16	–	–	–	3	–	4	–	7	–
167	Pepperell	3,029	–	–	3	–	–	–	2	–	1	–	–	–
168	Bellingham	3,015	–	–	3	–	–	–	–	–	–	–	1	–
169	Deerfield	2,988	–	–	2	–	–	–	–	–	–	–	–	–
170	Norton	2,985	–	–	1	–	–	–	1	–	16	–	4	–
171	Holliston	2,944	–	–	5	–	–	–	1	–	1	–	3	–
172	Rehoboth	2,829	–	–	–	–	–	–	–	–	–	–	–	–
173	Hull	2,799	–	–	2	–	–	–	4	–	–	–	–	–
174	Kingston	2,764	–	–	–	–	–	–	–	–	–	–	7	–
175	Hadley	2,720	–	–	–	–	–	–	1	–	–	–	3	–
176	Lenox	2,698	–	–	–	–	–	–	–	–	–	–	2	–
177	Acton	2,683	–	–	4	–	–	–	5	–	–	–	2	–
178	Hanover	2,680	–	–	33	–	1	–	7	–	–	–	4	–
179	Westwood	2,675	–	–	1	–	–	–	–	–	–	–	1	–
180	Hopkinton	2,632	–	–	2	–	–	–	10	–	6	–	1	–
181	Shirley	2,585	–	–	1	–	1	–	3	–	–	–	–	–
182	Groton	2,564	–	–	12	–	–	–	–	–	–	–	–	–
183	Northborough	2,538	–	–	–	–	–	–	4	–	–	–	3	–
184	Ashland	2,527	–	–	–	–	–	–	–	–	–	–	–	–
	Towns of 1,000–2,500	*163,940*	*14*	*1*	*510*	–	*6*	–	*152*	–	*211*	–	*124*	*1*
185	Lancaster	2,495	–	–	9	–	–	–	6	–	1	–	2	–
186	Sutton	2,491	–	–	22	–	–	–	2	–	1	–	1	–
187	Hanson	2,490	–	–	1	–	–	–	–	–	–	–	3	–
188	Manchester	2,474	–	–	–	–	–	–	–	–	–	–	2	–
189	Douglas	2,469	–	–	–	–	–	–	–	–	30	–	3	–
190	North Reading	2,440	–	–	–	–	–	–	–	–	3	–	2	–
191	Charlton	2,432	–	–	6	–	–	–	1	–	–	–	1	–
192	Hatfield	2,422	–	–	–	–	–	–	–	–	–	–	–	–
193	Duxbury	2,416	–	–	5	–	–	–	–	–	–	–	4	–
194	Rutland	2,396	–	–	14	–	–	–	–	–	2	–	–	–
195	Harwich	2,388	–	–	–	–	–	–	–	–	–	–	5	–
196	Hardwick	2,354	–	–	–	–	–	–	1	–	–	–	1	–
197	Avon	2,346	–	–	5	–	–	–	5	–	–	–	–	–
198	Hamilton	2,296	–	–	1	–	–	–	1	–	–	–	2	–
199	Burlington	2,279	–	–	1	–	–	–	–	–	–	–	–	–
200	Norfolk	2,277	–	–	3	–	–	–	2	–	–	–	–	–
201	Salisbury	2,261	–	–	2	–	–	–	9	–	–	–	4	–
202	Raynham	2,229	–	–	–	–	–	–	1	–	–	–	1	–
203	Marshfield	2,214	–	–	9	–	–	–	8	–	2	–	1	–
204	Millis	2,212	–	–	1	–	–	–	–	–	5	–	1	–
205	Upton	2,206	–	–	1	–	–	–	1	–	60	–	–	–
206	Yarmouth	2,191	–	–	16	–	–	–	9	–	–	–	–	–
207	Groveland	2,183	–	–	66	–	1	–	–	–	–	–	3	–
208	Lunenburg	2,181	–	–	2	–	–	–	6	–	2	–	1	–
209	West Boylston	2,173	–	–	4	–	–	–	–	–	2	–	–	–
210	Merrimac	2,152	–	–	2	–	–	–	16	–	1	–	4	–
211	Southborough	2,091	13	–	24	–	–	–	1	–	8	–	1	–
212	Chatham	2,088	–	–	11	–	–	–	–	–	–	–	5	–
213	Dennis	2,077	–	–	3	–	–	–	8	–	–	–	5	–

Lobar Pneumonia		Measles		Menin. Meningitis		Mumps		Ophthalmia Neonatorum		Scarlet Fever		Syphilis		Tuberculosis, Pulmonary		Tuberculosis, Other Forms		Typhoid Fever		Whooping Cough		
Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Line No.
2	2	1	-	-	-	4	-	-	-	6	-	1	-	3	-	-	-	-	-	-	-	139
10	3	3	-	1	-	10	-	-	-	2	-	-	-	13	15	-	-	-	-	3	-	140
1	3	-	-	-	-	122	-	-	-	20	1	-	-	-	2	-	-	-	-	-	-	141
-	3	9	-	-	-	7	-	-	-	7	1	-	-	1	2	-	-	-	-	-	-	142
3	4	1	-	-	-	113	-	-	-	3	-	1	-	2	1	-	-	-	-	-	-	143
6	4	1	-	-	-	1	-	-	-	6	-	7	-	-	2	-	-	-	-	-	-	144
9	2	26	-	-	-	57	-	-	-	3	-	4	-	2	1	-	-	-	-	-	-	145
-	2	1	-	-	-	12	-	-	-	16	-	-	-	3	3	-	-	-	-	22	-	146
-	-	-	-	-	-	-	-	-	-	-	-	3	-	1	-	-	-	-	-	-	-	147
1	3	10	-	-	-	6	-	-	-	5	-	-	-	1	1	-	-	-	-	7	-	148
2	2	28	-	-	-	15	-	-	-	10	-	4	-	6	4	2	1	-	-	-	-	149
3	-	196	1	-	-	12	-	-	-	12	-	1	-	2	-	1	-	1	-	-	-	150
-	3	93	-	-	-	48	-	-	-	4	-	-	-	2	2	-	-	-	-	1	-	151
-	-	-	-	-	-	-	-	-	-	15	-	3	-	1	-	-	-	-	-	4	-	152
9	6	10	-	-	-	2	-	-	-	4	-	1	-	1	2	-	-	-	-	20	1	153
1	-	3	-	-	-	8	-	-	-	17	-	-	-	1	2	-	-	-	-	-	-	154
2	2	2	-	-	-	-	-	-	-	5	-	4	-	-	1	-	-	-	-	-	-	155
4	1	6	-	1	1	42	-	-	-	6	-	4	2	7	3	1	-	-	-	9	-	156
-	1	-	-	-	-	-	-	-	-	-	-	5	-	2	3	2	-	-	-	-	-	157
4	1	32	-	-	-	8	-	-	-	5	-	-	-	-	-	-	-	-	-	1	-	158
1	1	-	-	-	-	28	-	-	-	-	-	5	-	-	3	-	-	-	-	-	-	159
2	-	42	-	-	-	48	-	-	-	7	-	2	-	1	1	-	1	-	-	3	-	160
2	1	62	-	-	-	6	-	-	-	2	-	6	-	2	-	1	2	1	-	-	-	161
-	-	101	-	-	-	3	-	-	-	-	-	2	-	7	-	-	-	-	-	-	-	162
-	-	-	-	-	-	-	-	-	-	1	-	1	-	1	-	-	-	-	-	-	-	163
2	1	5	-	-	-	3	-	-	-	33	-	4	-	2	1	-	-	-	-	2	-	164
5	2	5	-	1	-	-	-	-	-	5	-	1	-	-	-	-	1	-	-	-	-	165
5	3	4	-	-	-	30	-	-	-	2	-	5	-	4	1	-	-	-	-	23	-	166
-	3	5	-	-	-	-	-	-	-	11	-	1	-	-	2	-	-	-	-	-	-	167
-	1	6	-	-	-	-	-	-	-	1	-	-	-	-	2	-	-	1	-	1	-	168
-	2	61	-	2	-	8	-	-	-	8	-	-	-	-	-	-	-	-	-	-	-	169
1	3	-	-	-	-	1	-	-	-	21	-	2	-	-	1	1	-	-	-	-	-	170
1	1	-	-	-	-	7	-	-	-	3	-	4	-	-	1	1	-	-	-	1	-	171
-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1	-	-	-	-	-	1	172
2	-	5	-	2	1	3	-	-	-	22	-	5	-	4	1	1	1	-	-	1	-	173
-	3	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	174
1	2	-	-	-	-	-	-	-	-	10	1	1	-	-	-	-	1	-	-	-	-	175
1	1	-	-	-	-	-	-	-	-	5	-	2	-	-	-	-	-	-	-	-	-	176
1	1	2	-	-	-	17	-	-	-	1	-	2	-	-	1	-	-	-	-	-	1	177
1	1	77	-	-	-	-	-	-	-	4	-	2	-	3	1	-	-	-	-	1	-	178
1	-	2	-	-	-	-	-	-	-	2	-	1	-	-	1	-	-	-	-	-	-	179
8	4	7	-	-	-	27	-	-	-	18	-	2	-	1	1	-	-	1	-	-	-	180
5	-	-	-	-	-	4	-	1	-	2	-	1	-	1	-	-	-	1	1	-	-	181
1	2	7	-	-	-	2	-	-	-	11	-	1	-	-	-	-	-	-	-	-	-	182
-	-	2	-	-	-	1	-	-	-	5	-	-	-	-	-	-	-	-	-	1	-	183
1	-	-	-	1	1	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	184
89	*67*	*601*	*1*	*3*	*3*	*540*	-	*2*	-	*225*	-	*101*	*6*	*70*	*87*	*10*	*8*	*3*	-	*86*	*1*	
3	-	25	-	-	-	6	-	-	-	1	-	4	-	2	1	-	-	-	-	-	-	185
2	2	1	-	-	-	-	-	-	-	12	-	-	-	-	1	-	-	-	-	21	-	186
-	1	30	-	-	-	-	-	-	-	4	-	5	-	-	6	-	-	-	-	3	-	187
5	2	-	-	-	-	-	-	-	-	-	-	3	1	-	2	-	-	-	-	-	-	188
-	-	4	-	-	-	-	-	-	-	3	-	-	-	1	-	-	-	-	-	-	-	189
-	1	3	-	-	-	2	-	-	-	7	-	-	-	-	4	-	-	-	-	-	-	190
2	2	6	-	-	-	1	-	-	-	1	-	1	-	-	1	-	-	-	-	-	-	191
3	1	-	-	-	-	1	-	-	-	-	-	-	-	3	1	-	-	-	-	-	-	192
-	3	1	-	-	-	1	-	-	-	1	-	3	-	1	-	-	-	-	-	-	-	193
-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	25	-	-	-	-	-	-	194
-	-	-	-	-	-	-	-	-	-	-	-	6	-	3	-	-	1	-	-	-	1	195
-	-	3	-	-	-	-	-	-	-	1	-	-	-	-	1	-	1	-	-	-	-	196
1	-	88	-	-	-	47	-	-	-	1	-	3	-	-	-	-	-	1	-	7	-	197
2	2	3	-	-	-	-	-	-	-	6	-	-	-	1	-	-	-	-	-	-	-	198
4	3	-	-	-	-	-	-	-	-	1	-	5	-	-	-	1	-	-	-	-	-	199
-	1	25	-	-	-	1	-	-	-	1	-	-	-	22	-	1	-	-	-	-	-	200
-	-	3	-	-	-	4	-	-	-	2	-	1	1	-	2	-	-	-	-	-	-	201
-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	202
3	-	6	-	-	-	3	-	-	-	5	-	1	-	-	-	-	-	-	-	2	-	203
2	-	88	1	-	-	8	-	-	-	5	-	-	-	-	2	1	-	-	-	-	-	204
5	3	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	1	-	205
-	1	-	-	-	-	8	-	-	-	15	-	-	-	-	-	-	-	-	-	-	-	206
-	1	15	-	-	-	-	-	-	-	-	-	2	-	-	1	-	-	-	-	-	-	207
3	1	3	-	-	-	14	-	-	-	4	-	-	-	-	-	-	1	-	-	4	-	208
-	-	2	-	-	-	3	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	209
3	2	1	-	-	-	-	-	-	-	-	-	2	-	1	2	-	-	-	-	1	-	210
5	-	2	-	1	1	21	-	-	-	1	-	1	-	3	-	-	-	-	-	-	-	211
-	-	-	-	-	-	2	-	-	-	5	-	1	-	1	-	-	-	-	-	-	-	212
1	-	2	-	-	-	6	-	-	-	20	-	2	-	-	2	2	-	-	-	-	-	213

Line No.	Cities and Towns in Order of Population	Population estimated as of July 1, 1936	Anterior Poliomyelitis		Chicken Pox		Diphtheria		Dog Bite		German Measles		Gonorrhea	
			Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
214	Georgetown	2,057	–	–	2	–	–	–	13	–	1	–	1	–
215	Middleton	2,057	–	–	–	–	–	–	–	–	–	–	2	1
216	Ashburnham	2,042	–	–	1	–	–	–	–	–	1	–	–	–
217	Townsend	2,002	–	–	42	–	–	–	–	–	3	–	2	–
218	Lynnfield	1,992	–	–	3	–	4	–	11	–	1	–	–	–
219	Westminster	1,977	–	–	–	–	–	–	–	–	–	–	1	–
220	Stockbridge	1,972	–	–	3	–	–	–	8	–	–	–	2	–
221	Northfield	1,970	–	–	4	–	–	–	–	–	3	–	4	–
222	Sturbridge	1,965	–	–	–	–	–	–	1	–	–	–	–	–
223	Marion	1,939	–	–	3	–	–	–	6	–	1	–	7	–
224	Tisbury	1,910	–	–	–	–	–	–	–	–	–	–	3	–
225	Freetown	1,864	–	–	–	–	–	–	–	–	–	–	3	–
226	Sheffield	1,861	–	–	6	–	–	–	2	–	1	–	–	–
227	Williamsburg	1,850	–	–	48	–	–	–	3	–	–	–	–	–
228	Millville	1,836	–	–	–	–	–	–	–	–	–	–	1	–
229	Sudbury	1,782	–	–	–	–	–	–	–	–	–	–	–	–
230	Nahant	1,776	–	–	1	–	–	–	6	–	1	–	1	–
231	Oak Bluffs	1,759	–	–	–	–	–	–	–	–	–	–	1	–
232	Mattapoisett	1,739	–	–	3	–	–	–	–	–	52	–	1	–
233	Norwell	1,713	–	–	–	–	–	–	–	–	–	–	1	–
234	Pembroke	1,663	–	–	–	–	–	–	–	–	–	–	3	–
235	Cheshire	1,650	–	–	–	–	–	–	–	–	–	–	–	–
236	Shelburne	1,626	–	–	–	–	–	–	–	–	–	–	2	–
237	Carver	1,615	–	–	–	–	–	–	–	–	–	–	2	–
238	Plainville	1,613	–	–	–	–	–	–	–	–	–	–	1	–
239	Colrain	1,606	1	1	14	–	–	–	1	–	–	–	1	–
240	Lincoln	1,598	–	–	–	–	–	–	–	–	–	–	1	–
241	Newbury	1,591	–	–	–	–	1	–	–	–	–	–	1	–
242	Sterling	1,572	–	–	1	–	–	–	5	–	–	–	–	–
243	Southwick	1,565	–	–	–	–	–	–	3	–	–	–	1	–
244	Buckland	1,555	–	–	–	–	–	–	–	–	–	–	1	–
245	Littleton	1,555	–	–	32	–	–	–	3	–	–	–	1	–
246	Sandwich	1,541	–	–	1	–	–	–	–	–	–	–	1	–
247	Rowley	1,538	–	–	–	–	–	–	1	–	–	–	–	–
248	Orleans	1,503	–	–	1	–	–	–	1	–	–	–	–	–
249	Essex	1,493	–	–	–	–	–	–	–	–	–	–	–	–
250	West Newbury	1,451	–	–	–	–	–	–	–	–	–	–	3	–
251	Boylston	1,444	–	–	–	–	–	–	–	–	–	–	2	–
252	Edgartown	1,438	–	–	–	–	–	–	–	–	–	–	–	–
253	Lakeville	1,402	–	–	30	–	–	–	–	–	–	–	1	–
254	Huntington	1,378	–	–	–	–	–	–	–	–	–	–	–	–
255	Clarksburg	1,344	–	–	–	–	–	–	2	–	–	–	–	–
256	Dover	1,339	–	–	–	–	–	–	–	–	3	–	1	–
257	Chester	1,329	–	–	–	–	–	–	2	–	–	–	2	–
258	Tyngsborough	1,322	–	–	51	–	–	–	1	–	9	–	1	–
259	Mendon	1,315	–	–	–	–	–	–	2	–	4	–	–	–
260	Russell	1,298	–	–	–	–	–	–	–	–	–	–	5	–
261	Brookfield	1,295	–	–	2	–	–	–	–	–	2	–	4	–
262	Erving	1,285	–	–	–	–	–	–	–	–	–	–	1	–
263	West Brookfield	1,259	–	–	50	–	–	–	–	–	6	–	–	–
264	Lanesborough	1,258	–	–	–	–	–	–	–	–	–	–	–	–
265	Rochester	1,256	–	–	–	–	–	–	–	–	1	–	–	–
266	Wenham	1,220	–	–	–	–	–	–	–	–	–	–	–	–
267	Stow	1,205	–	–	1	–	–	–	–	–	3	–	1	–
268	Sunderland	1,189	–	–	1	–	–	–	–	–	–	–	–	–
269	Berkley	1,167	–	–	–	–	–	–	–	–	–	–	–	–
270	Topsfield	1,152	–	–	1	–	–	–	2	–	–	–	1	–
271	Hinsdale	1,144	–	–	–	–	–	–	–	–	–	–	–	–
272	West Stockbridge	1,141	–	–	1	–	–	–	2	–	–	–	3	–
273	Whately	1,132	–	–	–	–	–	–	–	–	–	–	–	–
274	Berlin	1,097	–	–	–	–	–	–	–	–	–	–	1	–
275	Sherborn	1,010	–	–	–	–	–	–	–	–	–	–	–	–
276	Bernardston	1,000	–	–	–	–	–	–	–	–	2	–	1	–
	Towns under 1,000	*41,626*	–	–	*90*	–	–	–	*29*	–	*37*	–	*21*	–
277	Gill	998	–	–	3	–	–	–	–	–	–	–	–	–
278	Hubbardston	998	–	–	–	–	–	–	–	–	–	–	–	–
279	Wellfleet	987	–	–	–	–	–	–	–	–	–	–	–	–
280	Granby	976	–	–	–	–	–	–	–	–	–	–	–	–
281	Conway	968	–	–	–	–	–	–	–	–	–	–	3	–
282	Southampton	961	–	–	–	–	–	–	–	–	–	–	–	–
283	Charlemont	957	–	–	–	–	–	–	–	–	–	–	–	–
284	East Brookfield	951	–	–	3	–	–	–	1	–	–	–	–	–
285	Ashby	950	–	–	3	–	–	–	–	–	5	–	–	–
286	Harvard	943	–	–	–	–	–	–	7	–	–	–	1	–
287	New Marlborough	939	–	–	3	–	–	–	1	–	6	–	1	–
288	Ashfield	936	–	–	–	–	–	–	–	–	–	–	–	–

Dangerous to the Public Health, 1936—Continued

Lobar Pneumonia		Measles		Menin. Meningitis		Mumps		Ophthalmia Neonatorum		Scarlet Fever		Syphilis		Tuberculosis, Pulmonary		Tuberculosis, Other Forms		Typhoid Fever		Whooping Cough		
Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Line No.
5	–	1	–	–	–	23	–	–	–	5	–	–	–	2	2	–	–	–	–	–	–	214
–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	11	–	–	–	–	–	–	215
9	3	1	–	–	–	1	–	–	–	19	–	2	–	1	1	–	–	–	–	–	–	216
–	–	2	–	–	–	20	–	–	–	3	–	2	–	–	–	–	–	–	–	2	–	217
2	–	24	–	–	–	4	–	–	–	3	–	1	–	1	2	–	–	–	–	–	–	218
1	3	–	–	–	–	–	–	–	–	1	–	1	1	2	1	–	–	–	–	–	–	219
–	–	5	–	–	–	7	–	–	–	2	–	1	–	–	–	–	–	–	–	–	–	220
1	–	6	–	–	–	22	–	–	–	2	–	–	–	2	1	–	–	–	–	–	–	221
–	–	–	–	–	–	–	–	–	–	–	–	2	1	–	–	–	–	–	–	–	–	222
1	–	2	–	–	–	46	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	223
–	1	–	–	–	–	–	–	–	–	–	–	3	–	–	–	–	–	–	–	–	–	224
–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	225
–	–	2	–	–	–	1	–	–	–	–	–	1	–	2	2	–	–	–	–	4	–	226
–	–	1	–	–	–	–	–	–	–	8	–	1	–	–	–	–	–	–	–	1	–	227
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	2	–	–	–	–	–	228
3	1	–	–	–	–	1	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	229
1	1	19	–	–	–	3	–	1	–	1	–	–	–	–	–	–	–	–	–	–	–	230
–	–	–	–	–	–	–	–	–	–	–	–	2	–	2	2	–	–	–	–	–	–	231
5	1	16	–	–	–	6	–	–	–	–	–	4	–	2	–	–	–	–	–	–	–	232
–	2	–	–	–	–	–	–	–	–	1	–	1	–	–	–	–	–	–	–	–	–	233
1	2	–	–	–	–	–	–	–	–	–	–	2	–	–	1	–	–	–	–	–	–	234
–	1	5	–	–	–	–	–	–	–	25	–	1	–	–	–	–	–	–	–	–	–	235
–	1	–	–	–	–	1	–	1	–	–	–	–	–	1	–	–	–	–	–	8	–	236
–	–	2	–	–	–	–	–	–	–	–	–	6	–	1	1	–	–	–	–	–	–	237
–	–	–	–	–	–	–	–	–	–	–	–	1	–	1	–	1	1	–	–	–	–	238
2	1	–	–	–	–	52	–	–	–	–	–	2	–	–	–	–	–	–	–	4	–	239
1	–	–	–	1	1	–	–	–	–	6	–	1	–	–	–	–	–	1	–	–	–	240
1	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	241
–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	242
–	1	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	243
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	244
1	–	9	–	–	–	80	–	–	–	3	–	1	–	1	–	–	–	–	–	–	–	245
2	1	8	–	–	–	–	–	–	–	1	–	–	–	2	–	–	–	–	–	–	–	246
–	1	–	–	–	–	–	–	–	–	–	–	3	–	–	–	–	1	–	–	–	–	247
1	–	11	–	–	–	–	–	–	–	4	–	1	–	–	–	–	–	–	–	–	–	248
–	–	12	–	–	–	3	–	–	–	–	–	–	–	1	–	1	–	1	–	–	–	249
–	1	2	–	–	–	17	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	250
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	–	–	–	–	–	–	251
–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	1	–	–	–	–	–	–	252
–	–	1	–	–	–	–	–	–	–	–	–	1	–	2	1	1	2	–	–	–	–	253
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	254
–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	2	–	–	–	–	–	–	255
–	2	4	–	–	–	8	–	–	–	5	–	–	–	–	–	–	–	–	–	–	–	256
–	–	–	–	–	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	–	–	257
1	2	57	–	–	–	–	–	–	–	1	–	1	–	–	–	–	–	–	–	–	–	258
–	2	2	–	–	–	–	–	–	–	1	–	2	–	1	–	–	–	–	–	–	–	259
–	–	–	–	–	–	–	–	–	–	2	–	1	1	–	–	–	–	–	–	2	–	260
–	1	1	–	–	–	2	–	–	–	2	–	1	–	–	–	–	–	–	–	2	–	261
–	1	10	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	262
1	1	1	–	–	–	84	–	–	–	15	–	4	–	–	–	–	–	–	–	15	–	263
–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	264
–	–	–	–	–	–	6	–	–	–	–	–	3	1	1	1	–	–	–	–	–	–	265
1	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	266
2	2	61	–	–	–	16	–	–	–	1	–	–	–	–	1	–	–	–	–	–	–	267
–	–	11	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	1	–	268
–	2	2	–	–	–	–	–	–	–	1	–	–	–	2	–	–	1	–	–	–	–	269
1	–	7	–	–	–	–	–	–	–	1	–	1	–	–	1	–	–	–	–	7	–	270
–	–	–	–	–	–	–	–	–	–	3	–	–	–	–	–	–	–	–	–	–	–	271
–	–	5	–	–	–	6	–	–	–	1	–	–	–	1	–	–	–	–	–	–	–	272
–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	273
–	–	–	–	1	1	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	274
2	–	–	–	–	–	2	–	–	–	3	–	1	–	–	–	–	–	–	–	–	–	275
–	3	–	–	–	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	–	–	276
8	*19*	*222*	*2*	1	–	*155*	–	–	–	*188*	*1*	*17*	*4*	*11*	*13*	–	*1*	*1*	–	*53*	*1*	
–	–	–	–	–	–	8	–	–	–	53	–	–	–	1	2	–	–	–	–	9	–	277
–	1	–	–	–	–	–	–	–	–	1	–	1	–	–	1	–	1	–	–	–	–	278
–	–	39	–	–	–	–	–	–	–	2	–	2	–	–	1	–	–	–	–	–	–	279
–	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	280
–	–	1	–	–	–	6	–	–	–	1	–	2	–	–	–	–	–	–	–	–	–	281
–	–	1	–	–	–	–	–	–	–	2	1	–	–	–	–	–	–	–	–	–	–	282
1	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	283
–	–	2	–	–	–	–	–	–	–	5	–	–	–	–	–	–	–	–	–	–	–	284
–	1	–	–	–	–	84	–	–	–	1	–	–	–	–	–	–	–	–	–	1	–	285
–	–	1	–	–	–	–	–	–	–	6	–	–	–	–	–	–	–	–	–	–	–	286
–	–	–	–	–	–	1	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	287
–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	4	–	288

Line No.	Cities and Towns in Order of Population	Population estimated as of July 1, 1936	Anterior Poliomyelitis		Chicken Pox		Diphtheria		Dog Bite		German Measles		Gonorrhea	
			Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
289	Hampden	908	–	–	–	–	–	–	–	–	–	–	–	–
290	Brimfield	894	–	–	–	–	–	–	–	–	–	–	–	–
291	Royalston	871	–	–	–	–	–	–	–	–	–	–	–	–
292	Halifax	844	–	–	–	–	–	–	–	–	–	–	–	–
293	Boxford	750	–	–	2	–	–	–	–	–	1	–	–	–
294	Paxton	749	–	–	–	–	–	–	–	–	–	–	–	–
295	Leverett	741	–	–	–	–	–	–	–	–	–	–	–	–
296	Becket	739	–	–	–	–	–	–	1	–	–	–	–	–
297	Petersham	736	–	–	4	–	–	–	1	–	1	–	–	–
298	Bolton	732	–	–	49	–	–	–	–	–	–	–	–	–
299	Carlisle	726	–	–	–	–	–	–	1	–	–	–	2	–
300	Granville	713	–	–	–	–	–	–	2	–	–	–	–	–
301	Princeton	704	–	–	–	–	–	–	–	–	–	–	–	–
302	Brewster	699	–	–	–	–	–	–	3	–	–	–	5	–
303	Richmond	643	–	–	–	–	–	–	–	–	–	–	–	–
304	Cummington	635	–	–	–	–	–	–	–	–	–	–	–	–
305	Warwick	628	–	–	–	–	–	–	–	–	–	–	–	–
306	Eastham	626	–	–	–	–	–	–	–	–	–	–	–	–
307	Egremont	587	–	–	–	–	–	–	–	–	–	–	1	–
308	Plympton	573	–	–	–	–	–	–	–	–	–	–	2	–
309	Truro	550	–	–	2	–	–	–	–	–	–	–	–	–
310	Worthington	545	–	–	–	–	–	–	–	–	1	–	–	–
311	Pelham	519	–	–	–	–	–	–	2	–	–	–	–	–
312	Enfield	495	–	–	7	–	–	–	–	–	–	–	–	–
313	Sandisfield	489	–	–	–	–	–	–	1	–	–	–	–	–
314	New Salem	452	–	–	1	–	–	–	–	–	–	–	–	–
315	Chesterfield	452	–	–	–	–	–	–	1	–	–	–	–	–
316	Blandford	445	–	–	–	–	–	–	–	–	–	–	–	–
317	New Braintree	445	–	–	–	–	–	–	–	–	–	–	–	–
318	Phillipston	443	–	–	–	–	–	–	5	–	–	–	1	–
319	Florida	435	–	–	1	–	–	–	–	–	–	–	–	–
320	Boxborough	433	–	–	–	–	–	–	–	–	–	–	–	–
321	Dunstable	430	–	–	2	–	–	–	–	–	22	–	–	–
322	Otis	430	–	–	6	–	–	–	1	–	1	–	–	–
323	Hancock	423	–	–	–	–	–	–	–	–	–	–	–	–
324	Oakham	422	–	–	–	–	–	–	–	–	–	–	–	–
325	Windsor	419	–	–	–	–	–	–	–	–	–	–	–	–
326	Westhampton	414	–	–	–	–	–	–	–	–	–	–	1	–
327	Wendell	412	–	–	–	–	–	–	–	–	–	–	–	–
328	Wales	389	–	–	–	–	–	–	–	–	–	–	–	–
329	Mashpee	386	–	–	–	–	–	–	–	–	–	–	1	–
330	Heath	379	–	–	–	–	–	–	–	–	–	–	–	–
331	Dana	350	–	–	–	–	–	–	–	–	–	–	–	–
332	Plainfield	339	–	–	–	–	–	–	–	–	–	–	–	–
333	Monterey	326	–	–	–	–	–	–	–	–	–	–	–	–
334	Hawley	307	–	–	–	–	–	–	–	–	–	–	–	–
335	Savoy	296	–	–	–	–	–	–	–	–	–	–	–	–
336	West Tisbury	285	–	–	–	–	–	–	–	–	–	–	–	–
337	Rowe	270	–	–	–	–	–	–	–	–	–	–	–	–
338	Washington	261	–	–	–	–	–	–	–	–	–	–	–	–
339	Goshen	259	–	–	–	–	–	–	–	–	–	–	1	–
340	Chilmark	253	–	–	–	–	–	–	–	–	–	–	–	–
341	Leyden	252	–	–	–	–	–	–	–	–	–	–	–	–
342	Monroe	247	–	–	–	–	–	–	–	–	–	–	–	–
343	Shutesbury	245	–	–	3	–	–	–	–	–	–	–	–	–
344	Tyringham	242	–	–	1	–	–	–	2	–	–	–	1	–
345	Middlefield	227	–	–	–	–	–	–	–	–	–	–	–	–
346	Holland	220	–	–	–	–	–	–	–	–	–	–	1	–
347	Alford	213	–	–	–	–	–	–	–	–	–	–	–	–
348	Greenwich	213	–	–	–	–	–	–	–	–	–	–	–	–
349	Montgomery	184	–	–	–	–	–	–	–	–	–	–	–	–
350	Peru	163	–	–	–	–	–	–	–	–	–	–	–	–
351	Gay Head	158	–	–	–	–	–	–	–	–	–	–	–	–
352	Tolland	142	–	–	–	–	–	–	–	–	–	–	–	–
353	Gosnold	131	–	–	–	–	–	–	–	–	–	–	–	–
354	New Ashford	100	–	–	–	–	–	–	–	–	–	–	–	–
355	Mount Washington	65	–	–	–	–	–	–	–	–	–	–	–	–
356	Prescott	9	–	–	–	–	–	–	–	–	–	–	–	–
357	Tewksbury State Infirmary		–	–	2	–	6	–	–	–	–	–	–	–

Dangerous to the Public Health, 1936—Concluded

Lobar Pneumonia		Measles		Menin. Meningitis		Mumps		Ophthalmia Neonatorum		Scarlet Fever		Syphilis		Tuberculosis, Pulmonary		Tuberculosis, Other Forms		Typhoid Fever		Whooping Cough		
Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Line No.
1	–	–	–	–	–	–	–	–	–	–	–	1	–	1	1	–	–	–	–	–	–	289
–	–	–	–	–	–	–	–	–	–	9	–	–	–	–	–	–	–	–	–	–	–	290
–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	291
–	–	–	–	–	–	–	–	–	–	1	–	1	–	–	–	–	–	–	–	–	–	292
–	–	3	–	–	–	–	–	–	–	3	–	–	–	1	–	–	–	–	–	3	–	293
–	1	1	–	–	–	–	–	–	–	3	–	–	–	–	–	–	–	–	–	–	–	294
1	–	–	–	–	–	–	–	–	–	6	–	–	–	–	–	–	–	1	–	–	–	295
–	–	1	–	–	–	5	–	–	–	7	–	–	–	–	–	–	–	–	–	8	–	296
1	–	45	–	–	–	–	–	–	–	16	–	–	–	–	–	–	–	–	–	–	–	297
–	1	4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	298
–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	299
–	2	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	300
–	–	1	–	–	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	1	–	301
–	–	–	–	–	–	–	–	–	–	2	–	–	–	1	1	–	–	–	–	–	–	302
–	–	1	–	–	–	–	–	–	–	3	–	–	–	–	–	–	–	–	–	–	–	303
–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	–	–	–	–	–	–	–	304
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	305
–	–	25	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	306
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	–	307
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	308
–	–	–	–	–	–	1	–	–	–	5	–	1	–	2	2	–	–	–	–	–	–	309
–	–	1	–	–	–	–	–	–	–	17	–	–	–	–	–	–	–	–	–	–	–	310
–	–	3	–	–	–	9	–	–	–	5	–	1	–	–	–	–	–	–	–	–	–	311
–	–	35	–	–	–	15	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	312
1	2	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	313
1	1	1	–	–	–	–	–	–	–	2	–	1	–	1	–	–	–	–	–	–	–	314
–	–	10	–	–	–	10	–	–	–	3	–	–	–	1	–	–	–	–	–	–	–	315
–	–	–	–	–	–	–	–	–	–	21	–	–	–	–	1	–	–	–	–	–	–	316
1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	317
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	318
–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	319
–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	320
–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	321
–	–	–	–	–	–	1	–	–	–	1	–	2	–	–	–	–	–	–	–	1	–	322
–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	323
–	1	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	324
–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	325
–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	326
–	–	5	1	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	24	1	327
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	328
–	–	–	–	–	–	–	–	–	–	–	–	1	3	1	–	–	–	–	–	–	–	329
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	330
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	331
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	332
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	333
–	1	5	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	334
1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	335
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	336
–	–	14	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	337
–	–	7	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	338
–	–	–	–	–	–	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	339
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	340
–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	341
–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	342
–	–	13	–	–	–	–	–	–	–	3	–	–	–	–	–	–	–	–	–	–	–	343
–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	344
–	–	–	–	–	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	–	–	345
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	346
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	347
–	–	–	–	–	–	11	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	348
–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	349
–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	350
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	351
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	352
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	353
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	354
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	355
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	356
38	6	1	–	4	–	–	–	–	–	4	–	–	1	59	14	–	1	–	–	–	–	357

In addition to the foregoing, there occurred 2 cases of actinomycosis with 2 deaths.

	Cases	Deaths
Boston	1	1
Marblehead	1	1

9 cases of anthrax with 1 death:

Haverhill	2	–
Lynn	3	–
Peabody	2	1
Pittsfield	1	–
Saugus	1	–

26 cases of dysentery with 5 deaths:

Amebic

Boston	1	–
Bolton	–	1
Cambridge	1	–
Quincy	1	–

Bacillary

Attleboro	10	–
Blackstone	–	1
Boston	1	–
Danvers	5	–
Lee	–	1
Malden	1	–
New Bedford	4	–
Salem	–	1
Stockbridge	1	–
Worcester	1	1

14 cases of encephalitis lethargica with 14 deaths:

Beverly	–	1
Boston	2	–
Greenfield	1	–
Holyoke	1	–
Hudson	1	1
Leyden	–	1
Lowell	2	2
Medfield	–	1
Milton	1	–
Monson	–	1
New Bedford	1	–
Newton	1	–
Salem	–	2
Saugus	1	1
Shrewsbury	–	1
Swampscott	1	1
Templeton	–	1
Townsend	1	–
Worcester	1	1

13 cases of malaria:

Boston	2	–
Brookline	1	–
Medford	1	–
Natick	1	–
New Bedford	1	–
Newton	2	–
Provincetown	1	–
Quincy	1	–
Salem	1	–
Taunton	1	–
Winchester	1	–

7 cases of paratyphoid fever with 1 death:

Ashburnham	1	–
Beverly	1	–
Boston	2	1
Cambridge	1	–
Springfield	1	–
Winchester	1	–

12 cases of pellagra with 14 deaths:

Beverly	–	1
Boston	5	4
Fitchburg	–	1
Lexington	1	–
Lowell	–	1
Lynn	1	1
Nahant	1	1
North Adams	1	1
Norton	1	–
Randolph	–	1
Revere	1	1
Waltham	1	1
Wareham	–	1

156 cases of septic sore throat with 43 deaths:

Abington	1	–
Amesbury	3	–
Barnstable	2	–
Belmont	2	–
Beverly	4	1
Billerica	1	1
Boston	45	8
Blackstone	–	1
Braintree	1	1
Brookline	3	–
Cambridge	4	2
Chelmsford	–	1
Chicopee	6	–
Concord	1	–
Danvers	1	–
Easthampton	2	–
Easton	3	–
Everett	–	1
Fall River	2	1
Fitchburg	1	–
Foxborough	2	–
Gardner	25	–
Georgetown	1	–
Gt. Barrington	1	–
Haverhill	3	1
Holyoke	–	1
Hopkinton	–	2
Ipswich	–	1
Lowell	2	3
Lynn	7	2
Malden	1	–
Marshfield	1	–
Medford	1	1
Melrose	1	–
Middleborough	1	–
Milton	1	–
New Bedford	2	–
Newton	1	2
North Adams	–	1
Palmer	–	1
Petersham	8	–
Plymouth	1	–
Quincy	–	1
Revere	–	1
Somerset	1	1
Somerville	3	–
Springfield	–	1
Stoneham	1	–
Watertown	1	–
Wellesley	3	–
West Brookfield	4	–
West Springfield	–	1
Weymouth	–	1
Winchester	–	2
Worcester	2	2
Wrentham	–	1

20 cases of tetanus with 15 deaths:

Boston	1	1
Boxford	–	1
Brockton	1	1
Brookline	2	–
Fall River	2	1
Granby	1	–
Groveland	1	–
Hudson	1	–
Lee	1	1
Leverett	–	1
Lowell	2	3
Lynn	–	1
Middleborough	–	1
Nantucket	1	1
Rehoboth	1	–
Saugus	1	–
Springfield	2	2
Stoughton	1	–
Worcester	2	1

27 cases of trachoma:

Boston	7	–
Brookline	1	–
Cambridge	4	–
Chelsea	1	–
Haverhill	1	–
Lynn	1	–
Malden	5	–
Marlborough	1	–
Medford	1	–
Springfield	1	–
Westfield	1	–
Worcester	3	–

	Cases	Deaths
36 cases of trichinosis with 2 deaths:		
Agawam	2	–
Arlington	1	–
Attleboro	1	–
Boston	13	–
Brockton	1	1
Brookline	1	–
Cambridge	1	–
Chicopee	2	–
Concord	1	–
Framingham	1	–
Greenfield	–	1
Haverhill	1	–
Lowell	3	–
Medford	1	–
Springfield	6	–
Wakefield	1	–
548 cases of tuberculosis, hilum:		
Amherst	1	–
Arlington	2	–
Athol	2	–
Boston	350	–
Bourne	1	–
Braintree	1	–
Brockton	1	–
Cambridge	15	–
Chelsea	25	–
Chicopee	1	–
Dartmouth	2	–
Everett	3	–
Fairhaven	1	–
Fall River	1	–
Falmouth	4	–
Fitchburg	12	–
Framingham	1	–
Hadley	1	–
Haverhill	1	–
Lawrence	5	–
Leominster	1	–
Ludlow	2	–
Lynn	2	–
Malden	7	–
Methuen	3	–
Middleborough	6	–
Needham	3	–
New Bedford	43	–
Newton	1	–
North Adams	1	–
Pittsfield	1	–
Quincy	10	–
Revere	7	–
Rockland	1	–
Somerville	7	–
Southbridge	1	–
Springfield	11	–
Wareham	5	–
Watertown	1	–
Weymouth	1	–
Winthrop	4	–
5 cases of typhus fever with 1 death:		
Boston	3	–
Chelsea	1	1
Petersham	1	–
55 cases of undulant fever with 4 deaths:		
Adams	1	–
Ashby	1	–
Attleboro	2	–
Barnstable	1	–
Beverly	1	–
Boston	1	–
Bourne	1	–
Brockton	1	–
Clarksburg	1	–
Conway	2	–
Dalton	3	–
East Brookfield	1	–
Fitchburg	1	–
Gardner	1	–
Georgetown	1	–
Hardwick	1	–
Holyoke	1	–
Lenox	1	–
Middleborough	–	1
Milford	1	–
Milton	1	–
New Marlborough	1	–
Newburyport	1	–
Norfolk	1	–
North Adams	2	–
Northampton	2	–
Norton	3	–
Pittsfield	6	1
Quincy	1	–
Rutland	1	–
Sheffield	1	–
Somerville	–	1
Springfield	2	1
Sudbury	1	–
West Brookfield	1	–
Westfield	1	–
Weston	1	–
Whitman	1	–
Williamstown	1	–
Winchendon	1	–
Worcester	2	–
Wrentham	1	–

REPORT OF THE DIVISION OF FOOD AND DRUGS

HERMANN C. LYTHGOE, *Director*

The Food and Drug Division during the year 1936 has been engaged in the usual routine work relative to the enforcement of the laws pertaining to the sale of milk, foods and drugs; the slaughtering laws; the cold storage laws; the bakery law; the mattress law; the frozen dessert law; the law pertaining to the pasteurization of milk; the law pertaining to the sale of wood alcohol; the law pertaining to the bottling of carbonated nonalcoholic beverages; and certain phases of the narcotic law; as well as in the examination of liquors and chemicals submitted by Police Departments.

There were no important changes in legislation during 1936 pertaining to the work of the Division. Under the Social Security Act the Department has appointed an additional inspector and an additional bacteriologist. The work under this Act is mostly examination of milk intended for pasteurization.

Licenses and permits as follows have been issued:

Under the law pertaining to the sterilization of feathers, down, and secondhand material, 8 licenses at $50.

Under the frozen dessert law, twenty-nine permits to out-of-State manufacturers, the fee depending upon the quantity imported, the total fees amounting to $612.20.

Under the law pertaining to State licensing of dealers in wood alcohol, 143 licenses at $10.

Under the law pertaining to the importation of carbonated nonalcoholic beverages, nine permits at $20.

Under the narcotic law, 52 licenses at $10.

Under the law pertaining to soft drink permits, there was $2,690 received from local boards of health, representing half the fees collected by them.

The Department also licensed 56 cold storage warehouses at $10 per license.

The total amount of fees for licenses and permits was $6,392.20.

PROSECUTIONS

There has been an increase in the number of prosecutions, due largely to the discovery of a test for tea seed oil; to an increase in the sale of decomposed meat; to the activity of the inspectors under the soft drink law; to the sale of methyl alcohol without license; and to a great increase in violations of the law pertaining to bedding and upholstered furniture.

The prosecutions for the sale of low standard milk were not excessive. Most of these cases were brought against restaurants, the proprietors of which served partially skimmed milk to their patrons. The cases for the sale of milk from which a portion of the cream had been removed were brought mostly against milk dealers. Cases involving the sale of milk containing added water were brought mostly against producers. Two cases were brought against milk dealers for selling milk with a fat content less than specified on the cap, and one case was brought against a person for representing unpasteurized milk as pasteurized milk.

At the time of the flood in the Connecticut Valley and in the Merrimack Valley, during the spring of 1936, certain dealers manufactured milk out of skimmed milk powder, cream, sweet, or, in 1 instance, rancid butter, and water. The cases which the Department had were pooled with cases of some of the milk inspectors in the neighborhood of Boston. These cases, handled by the Attorney General, resulted in an indictment of the Whiting Milk Companies and indictments of several persons connected with the Company, for conspiracy.

The case against the Whiting Milk Companies resulted in a plea of guilty and the imposition of a $100 fine for selling milk containing a foreign substance. The other count was placed on file on plea of guilty.

There were 3 persons indicted for conspiracy: — Joseph Willman, Werner Willman, and John Keenan. These were disposed of as follows: — conviction in the case of Joseph Willman, with a fine of $25; in the case of Werner Willman a plea of nolo contendere was accepted and the case placed on file; the case of John Keenan was nol prossed. Another case of conspiracy against the three defendants resulted in a finding of guilty and placing on file of the case against Joseph Willman; a plea of nolo contendere and placing on file in the case of Werner Willman; and the case against John A. Keenan was nol prossed.

A complaint was received from the Board of Health of Newton, together with the submission of 3 samples delivered in that City by the United Farmers Co-operative Creamery Association, Inc. These samples were examined by Mr. Ferguson of this division, and prosecutions were brought by the City of Newton in the Newton Court, resulting in conviction on all counts, and a fine of $100.

The cases for violation of the pasteurization law and regulations were mostly for operating under unsanitary conditions. When one considers that there are more than 700 such plants in this State, and more than 1,800 inspections have been made during the year, these violations are few in number.

There were 6 cases brought for violation of the milk grades, 5 resulting in conviction, and there was 1 case for the sale of low standard butter, resulting in conviction.

There were 2 cases for the sale of cheese containing vegetable gum, both of which have been appealed, and the appealed cases are still pending. There are several more cases, which have not been set, an agreement being made with the counsel that 1 of the cases will go to the Supreme Court, and if the Court finds for the defendant the other cases will not be prosecuted.

There were 2 cases for the misbranding of milk as to the day of the week upon which the milk was pasteurized, 1 resulting in conviction and 1 resulting in acquittal.

There were 30 cases for violation of the law relating to the use of sodium sulphite in hamburg steak. Some of these cases were for failure to label the material. The balance were for using a quantity in excess of that permitted by statute.

The number of cases involving the sale of adulterated olive oil were in excess of those of previous years, due to the use of tea seed oil as an adulterant. Shortly after the test was discovered by Mr. Fitelson of the U. S. Department of Agriculture, the use of this oil as an adulterant practically ceased.

There were 5 cases for the sale of food containing sodium benzoate without marking the package as required by the regulations. Four of these resulted in conviction.

There were 23 cases for the sale of sausage containing sodium sulphite in violation of the law; 6 cases for the sale of sausage containing excessive quantities of starch; and 2 cases for the sale of sausage containing lungs.

There has been a considerable increase in the sale of decomposed foods; 3 cases for the sale of rancid butter; 1 case for the sale of decomposed eggs; 1 case for the sale of decomposed ham; 67 cases for the sale of decomposed hamburg steak; 1 case for the sale of decomposed meat loaf; 26 cases for the sale of decomposed sausage; and 1 case for the sale of decomposed veal.

There was 1 case under the false advertising law against the Growers' Outlet, Inc. of Greenfield for representing as fresh eggs, eggs which were not fresh. These eggs had about the same composition as storage eggs more than a year old, but it is possible that the eggs may have been incubator rejects. The case resulted in a fine of $200, an appeal, and the payment in the Superior Court of the $200 fine.

One case pertaining to the false advertising of orangeade resulted in a finding of not guilty.

There were 6 cases for violation of the frozen dessert law, less than half of the number of cases prosecuted in 1935.

The law pertaining to the manufacture of carbonated nonalcoholic beverages was revised in 1935, giving the Department of Health more authority than it had under the former law. This Act went into effect in the latter part of October, 1935, so that for practical purposes, 1936 was the first year of enforcement.

Twelve persons were prosecuted for operating without permits. One person was prosecuted for selling carbonated beverages manufactured outside of the State, the manufacturer of which did not have a permit. Twenty persons were prosecuted for operating under unsanitary conditions, and 3 were prosecuted for using wash water deficient in caustic alkali.

Most of the plants, the proprietors of which were prosecuted for operating without a permit, were operating under unsanitary conditions. One plant was found to have been operating for nearly three years without a permit from the local Board of Health. The employee of the owner was advised to tell the owner that unless he obtained a permit he would be prosecuted. This statement was made in the presence of the health officer of the town. It was stated at that time that the entire

output for the season had been manufactured and no further manufacturing would be done. The proprietor did not obtain the permit. The local inspector was subsequently advised to see that the permit was obtained and he stated that he believed no material had been made for three years.

Two inspectors of the Department were then sent to investigate and in one day they obtained evidence as to the sale of 50 cases of bottled carbonated beverages during a period of approximately one week, and they obtained admission from the owner of the plant that he had bottled this material a short time prior to the inspectors' visit. A case was immediately set. The proprietor immediately obtained his license, and subsequently paid a fine of $25.

There were 9 cases for violation of the sanitary food law. One case related to an unsanitary soda fountain. Four cases related to unsanitary cheese factories. One case related to an unsanitary sausage factory. One of the dirty cheese factory cases was found not guilty by the court, the defence being that the inspection was made on a Hebrew holiday and consequently no manufacturing could have been done on that day. The two witnesses for the Commonwealth testified that they saw business going on at the time of their visit.

Another case involved the manufacture of a food product, either sour cream or cheese, by the addition of mouldy butter. This case resulted in a finding of not guilty. The inspector did not wait to see the completion of the process.

Seven persons were convicted for violation of the bakery law, largely because of operating under unsanitary conditions.

There were 7 convictions for the sale of sewage polluted shellfish.

There were only 8 cases for the sale of adulterated drugs, all resulting in conviction.

There were 12 cases brought for violation of the law pertaining to the sale of wood alcohol. Most of these cases were for selling without permits, and 1 case involved the sale of wood alcohol without the "Poison" label.

The only cold storage prosecutions were 2 cases for selling storage eggs without marking the container.

There were 7 cases for violation of the slaughtering laws, practically all pertaining to slaughtering in the absence of a duly appointed inspector. One of these cases resulted in a finding of not guilty.

There were 56 cases for violations of the law pertaining to bedding and upholstered furniture. These cases were either for using secondhand material and labeling it "New" or for failing to specify the character of the material used in the manufacture.

There were 3 cases involving obstruction of an inspector, all resulting in conviction. Two of these cases were brought against one person under assault and battery and larceny charges rather than obstruction. These 2 cases resulted in conviction, appeal, and conviction in the Superior Court. The assault and battery and larceny charges involved forcibly taking the purchased sample from the inspector.

The results of the prosecutions will be found in Table 1. Wherever an appeal is noted, the appealed case was pending at the close of the fiscal year. Other cases which were appealed and disposed of in the Superior Court are not listed as appealed, but the disposition of the case is as was handed down in the Superior Court.

Slightly more samples of material were collected and examined than during the previous year. This is due to the addition of the other inspector and bacteriologist.

There were 5,962 samples of milk collected for chemical examination, of which 45 samples showed evidence of partial removal of cream and 39 samples showed evidence of the addition of water. Many of these samples were collected at milk plants where milk was pasteurized. The results of the analyses of these samples are shown in Tables 2 and 3.

The apparently high number of low standard samples shown in Table 2 should not be construed to mean that the market milk is of this quality. High standard and low standard milk are mixed together at the milk plants in such a manner that the resulting milk is above the legal standard. Of these milk samples 5,812 were collected by the inspectors and 5,728 such samples were found not to be adulterated. The average composition of these samples was 12.59% total solids and 3.97% fat. The Massachusetts milk standard is 12.00% total solids and 3.35% fat. The

standard for Grade A milk required by the milk grading regulations is 4.00% fat and 12.20% total solids.

The lowest average fat percentage during any one month of the year was 3.90% for the month of July, representing the average of 542 samples. The highest fat figure was 4.08% for the month of October, representing the average of 358 samples. It is very evident that the people of Massachusetts enjoy a very high quality of milk, so far as chemical composition is concerned.

In Table 4 will be found the summary of the bacteriological examinations of milk as well as of ice cream and other foods.

The milk samples showed on the whole fairly good compliance with the requirements. There were 4,599 samples collected, and only 752 of these were found to have bacteria counts in excess of the requirements. In considering these figures it should be borne in mind that the regulations provide that if a sample has a high count a warning notice must be sent and subsequent samples obtained during the next two months, and if a majority of the subsequent samples are found to contain bacteria in excess of that prescribed by the regulations, a prosecution may result. It should also be borne in mind that a sample of pasteurized milk with a 41,000 count is illegal, whereas a sample of milk with a 40,000 count is legal.

The certified and pasteurized milk had the lowest bacteria counts, 58 of the 61 samples showing counts below 100. The highest count on this milk was 590, the maximum permitted by the grades being 500.

There were 64 samples of raw certified milk examined, 57 with counts below 5,000 and only 2 with counts above 10,000, the highest count being 12,000.

There were 50 samples of special milk examined, 3 of the pasteurized samples being above the 5,000 limit, and 4 of the raw samples being above the 50,000 limit. The highest count on the special milk pasteurized was 15,000, and on the special milk raw was 670,000.

There were 358 samples of Grade A milk pasteurized examined, 83 with counts above 10,000, the highest count being 380,000. The geometric mean of these counts was calculated for the four seasons of the year. The December, January, February samples had an average count of 5,380. The spring samples had an average count of 2,763. The summer samples had an average count of 4,764, and the fall samples had an average count of 3,733. The standard is 10,000.

There were 147 samples of Grade A milk raw obtained, 9 of which had counts above the 100,000 standard. The highest count was 370,000.

There were 1,649 samples of pasteurized milk collected, 332 of which had counts above 40,000, the highest count being 1,100,000. The geometric mean of these figures was also computed according to seasons. The samples collected in the winter had an average count of 11,000. Samples collected in the spring had an average count of 11,272. Samples collected in the summer had an average count of 17,620. Samples collected in the fall had an average count of 12,474. These averages follow the expected seasonal variation due to the hot weather during June, July, and August, and the somewhat high count of September, October, and November is due to the warm days in the early part of September. The standard count for pasteurized milk is not more than 40,000.

There were collected 429 samples of raw milk sold as such, 28 of which contained more than 400,000 count. The highest count was 1,000,000. The raw milk samples show a higher percentage conforming with the regulations than do the pasteurized milk samples. It should, however, be understood that the maximum count for raw milk is ten times that of pasteurized milk.

There were 2,583 samples collected at the milk pasteurization plants, of which 1,744 had counts below 100,000; 2,157 had counts below 250,000; 2,287 had counts below 400,000; and 296 had counts above the maximum standard of 400,000. The geometric mean of these samples was computed according to seasons. The samples collected in the winter had an average count of 50,000. The samples collected in the spring had an average count of 39,000. The samples collected in the summer had an average count of 61,800. The samples collected in the fall had an average count of 32,900.

There were 36 samples of cream examined, of which 12 had counts above 100,000. The lowest count was 1,000. The highest count was 980,000.

There were 952 samples of ice cream examined, of which 80 had counts

above 100,000. The lowest count was less than 1,000. The highest count was 3,300,000. The ice cream samples do not show such a seasonal variation as is shown by the milk samples. This difference is no doubt due to the low temperature at which ice cream is kept and also the relatively higher temperature at which the ice cream mix is pasteurized. There is no need for worrying about cream line in ice cream, and frequently ice cream is pasteurized at temperatures above 150° F. The average count for the winter months was 14,000; for the spring months 11,000; for the summer months 12,000; and for the fall months 7,500.

At the close of the spring floods many samples were examined to gather information as to whether the material should be confiscated. Of 23 such samples under suspicion 15 showed contamination and 8 did not.

There were 58 empty milk and soft drink bottles examined to ascertain their sterility. Eleven were found to be sterile as provided in the regulations and 47 were found to be not sterile.

There were 39 bacteriological examinations made in connection with licensing of plants to sterilize material used in bedding. Four of these examinations showed improper sterilization. The other 35 showed compliance with the requirements.

A total of 6,489 bacteriological examinations was made, of which 5,578 complied with the requirements.

Table 5 gives a summary of the analyses of samples of food.

There were 3,348 such samples collected, of which 609 were adulterated or misbranded. Of the 111 samples of butter examined, 70 were adulterated or misbranded. Most of these samples were below the legal standard of 80% fat.

It was apparently the practice of the trade to ship butter into Massachusetts with the fat percentage slightly below the 80% required by statute but not sufficiently lower to warrant trouble. It is also possible that these manufacturers presumed that a slight evaporation of the moisture would take place, resulting in an increase in the fat content so as to bring it above the legal standard. Of these samples 25% had fat percentages below 79.6% and 25% had a fat percentage above 81.8%; 43% of the samples were between 79.0% and 81.8%; and 21% of the samples were between 79% and 80%. The lowest fat of these samples was 73.9%; the highest fat was 86.9%; and the average fat was 80.61%.

Several hearings were given. Several samples were collected with a view of prosecuting the persons shipping the material interstate, and subsequent to the hearings a higher quality of butter began to come into the State. The creamery representatives brought to the hearings the results of the analyses of the various churnings. Upon questioning it was ascertained that the analysis consisted of a determination of the moisture content, a determination of the salt, and the assumption of a constant curd content, the fat being then determined by difference. The liability of error in the moisture determination would be toward a low percentage, which would result in an apparently high percentage in the fat.

The Department also had several complaints regarding rancidity in butter, most particularly at the close of the fiscal year. One case has been disposed of and several more cases are pending.

The Department received one complaint regarding misbranding of celery; namely, that celery produced elsewhere than in New England was sold with a label indicating local production. We were able to confirm this and a conviction was obtained. Without doubt, there is considerable more violation of this character but it is of course difficult and in many instances impossible to obtain the evidence.

There were 5 samples of candy examined, of which 3 were reported as adulterated. One sample contained a liquid containing sodium benzoate without a statement to that effect being placed upon the package. Another was infested with worms. A third sample bore some misleading statements regarding its nutritional value.

There were 122 samples of cheese examined, of which 77 were reported adulterated. It has been apparent for some time that material was being added to certain types of cheese, specifically those sold under the name of "cream cheese," which would increase the moisture content of the finished product. Factory inspections were made and samples of material used in the manufacture of cheese were obtained. One of these materials was found to be locust bean flour. Messrs. Ferguson and Racicot studied this and other material and finally evolved a method by which the presence of this material in cheese could be detected.

Cream cheese was made in the laboratory with and without the addition of locust bean flour and other gums. It was found that the addition of small quantities of these gums, frequently as low as 0.2%, resulted in an increase in cheese quantity of from 50% to 200%. The manufacturers stated that this material was added for the purpose of preventing the cheese from "leaking." Without doubt it would do so, but the manufacturers disclaimed any increase in quantity of cheese from a definite quantity of milk.

There were 39 samples of cream examined, of which 7 were misbranded as to grade.

There were 7 samples of dried fruits examined, 5 of which were sold without the necessary label showing the presence of sulphur dioxide.

There were 51 samples of eggs examined, 9 of which were adulterated or misbranded. These eggs were eggs which were not fresh but were represented to be fresh, cold storage eggs sold without the necessary label, or decomposed eggs obtained in bakeries.

The single sample of fish reported adulterated was obtained from a cold storage warehouse and an analysis was made prior to confiscation.

There were 1,033 samples of frozen desserts examined, none of which were adulterated or misbranded. The standard for fat in ice cream is 10% with a reduction to 8% in the case of the addition of fruits, nuts, etc. The analyses of these samples were compiled and plotted on probability plotting paper. The lowest fat was 8%. Twenty-five per cent of the samples contained less than 12.8% fat; 50% of the samples contained less than 15.1% fat; 25% of the samples contained more than 18.2% fat; and the highest sample contained 27.5% fat. Of these samples 80% contained between 11.5% and 20.5% of fat.

These analyses plot in three series. One series, representing 25% of the total samples, contained from 8% to 12.5% of fat. This represents the cheap ice cream and it is above the legal standard. Sixty-seven per cent of the samples contained from 13% to 21% of fat, which represents the bulk of the ice cream sold at a price above that of the cheap ice cream. Eight per cent of the samples contained more than 21% of fat, and this series represents the high priced ice cream. In purchasing ice cream, the purchaser gets just about what he pays for.

There is a standard of 1.6 pounds of food solids per gallon. The samples collected by the inspectors represent mostly pint and half pint samples, and it is to be expected that the measurements of such samples cannot be accurate. The presence of a small globule of air in a half pint sample would make a marked difference in the pound of food solids per gallon.

Of the 281 samples examined, 1.2% were found to contain from 1.25 to 1.38 pounds of food solids per gallon. Subsequent investigation of one gallon lots of these manufacturers showed the food solids per gallon to be above 1.6 pounds. Forty-five per cent of these samples contained between 1.6 and 2.1 pounds of food solids per gallon. Fifty-four per cent contained between 2.1 and 4.0 pounds of food solids per gallon. Either the standard is very liberal or the ice cream manufacturers are making a superior product, and the public with a discriminating taste is purchasing the superior article.

There were obtained 9 samples of maple products, of which 2 were adulterated or misbranded. These represented alleged maple syrup served in restaurants.

A large number of samples of meat products was examined and considerable adulteration, misbranding, or violations of the regulations was found. There was 1 sample of ham, 146 samples of hamburg steak, 1 sample of meat loaf, and 74 samples of sausage in violation of the law or regulations. These violations consisted of the use of sulphite preservatives without labeling the package, in the use of excessive quantities of sodium sulphite, and in the sale of decomposed meat.

Some of the hamburg steak was decomposed and contained sufficient sodium sulphite to deodorize the bad smell of the meat. The same is true of some of the sausages. The decomposition was not entirely confined to the proteins, and in many instances, particularly in fat hamburg steak and pork sausages, the fat itself was rancid, and in a few instances both rancid fat and decomposed protein were found. The decomposed hamburg steak was not always confined to the cheapest.

In many stores the inspectors cannot obtain these articles because the inspector

has obtained bad food at a previous time and he is known. Dealers using sulphite preservatives will properly mark the package which they sell to an inspector whom they know, but they will not mark the packages which they sell to their regular customers. With an increase in the price of meat, it is to be expected that there will be an increase in the use of decomposed meat in this type of meat product.

There were 51 samples of a miscellaneous nature, of which 8 were found to be adulterated or misbranded. Four of these represented swelled canned goods submitted by the Board of Health of Hingham. This material was canned under a local project and much of the material showed evidence of improper canning.

One sample represented as maple syrup was submitted by a wholesale grocer. His story was that a man in an automobile with a Vermont registration called at his place of business and brought him two cans of maple syrup which were opened and found to be satisfactory, and the wholesale grocer bought the entire shipment of about forty cans. He paid for the shipment by check and then looked over the balance of the cans and suspected that their contents was not maple syrup. He then telephoned the bank and found the check had been cashed. He then wrote a letter to the man in Vermont, and the letter was returned.

The sample examined by the Department showed that the wholesale grocer's surmise was correct. The material was not maple syrup. Unfortunately, the grocer had neglected to record the registration number of the automobile.

Another of the miscellaneous samples was some sausage submitted by the Board of Health of Worcester, and still another sample was butter submitted on complaint.

Olive Oil

There were 185 samples of olive oil examined, of which 67 were found to be adulterated or misbranded. The adulterant in most of these cases was tea seed oil. This oil has practically the same chemical and physical constants as olive oil. It was known for more than a year that this fraud was being perpetrated, and all methods which might lead to the detection of this oil were carefully studied by the chemists of the division.

The U. S. Department of Agriculture gave this Department a method devised by Mr. Fitelson, one of the chemists in the New York laboratory of that department. This method was a color reaction specific for tea seed oil and approximately quantitative. The Department agreed not to divulge the method until permitted to do so by the Department of Agriculture.

Sufficient samples had been collected prior to receipt of this method. Hearings were held, and in a few instances the lawyers representing the defendants were shown the test, but the method was not divulged.

The case first set resulted in a finding of guilty without any request for the method on cross examination. When the first case against the Cosmos Food Stores, Inc. of Lynn was tried, the chemist was asked to give on the witness stand the method, which he declined to do because of the agreement which the Department had made with the Department of Agriculture. This case was continued as was a similar case in Boston and no further cases were entered.

Shortly afterward, a case came up in the United States Court in Concord, at which case Mr. Ferguson of this Department, Mr. Howard of the State Board of Health of New Hampshire, and Dr. Bailey of the Agricultural Experiment Station of New Haven, Connecticut, testified. Mr. Ferguson had analyzed a sample and he was the first technical witness to testify and had to stand most of the cross examination. The validity of the test was confirmed by Dr. Bailey and by Mr. Howard; and Mr. Fitelson, the discoverer of the test, also testified. The case resulted in a finding against the claimant for the goods.

Subsequently the other cases were set in the Massachusetts courts. A few of the cases were appealed and all but one of the appealed cases were disposed of by convictions prior to the close of the fiscal year.

The hearings given by the Department prior to prosecution resulted in some very interesting statements on behalf of the defendants. Practically all denied using the material. They all acknowledged purchasing it but stated that it was used in mixed oil. They were asked if the person from whom the oil was purchased informed them that it could not be detected by a chemist, to which they all replied

"no," and one person anticipated the question and said "no" before the question was completed.

Subsequent to conviction, one person acknowledged that he was informed by the vendor of this oil that a chemist could not detect it. A number of persons who refused to buy this oil stated that it was offered for sale with the understanding that it could be mixed with olive oil and a chemist could not find it, but it seems most strange that persons who actually purchased the oil denied that it had been so represented to them.

There were 81 samples of pickles collected, of which 32 were found to contain benzoic acid without the package being labeled as required by the regulations. Many of these samples trace back to an importation from a southern State. This information was given to the U. S. Department of Agriculture and that Department reported that no investigation was made of the samples in Massachusetts but that shipments were obtained and a prosecution made for short weight, the subsequent shipments being free from benzoic acid.

There were 299 samples of soft drinks examined, of which 128 were declared to be adulterated or misbranded. Some of these samples contained sodium benzoate and its presence was not declared upon the label. In the case of the carbonated beverages the benzoate was in the concentrate and the amount in many of the samples of beverages was small but under the law the Department has no authority to modify the regulations of the U. S. Department of Agriculture, which provide that material containing sodium benzoate may be sold provided each package is labeled with the quantity of sodium benzoate in the material. The quantity, however, is sufficient to be detected and determined in a one ounce sample.

During recent years dairymen have been distributing orangeade. This material is made from concentrates, mostly shipped in interstate commerce. This material was a severe competitor of carbonated beverages and many complaints were received as to unsanitary conditions connected with bottling. These conditions were investigated and the bottling of orangeade by the dairymen was found to be carried on with as much care as was exercised in connection with the bottling of milk. The bottles were properly washed and the bottling machinery was clean.

A complaint was made to the Department of Agriculture and a ruling regarding the color was promulgated by that Department, and from information received it is believed that the manufacturers of carbonated beverages first appealed to the Department of Agriculture regarding this matter. That Department has issued three rulings to the effect that the addition of color to certain foodstuffs, even if declared upon the label, still rendered the article adulterated within the meaning of the statute. The first such ruling pertained to macaroni and egg noodles. The second ruling pertained to orangeade. The third ruling pertained to tomato paste. Subsequently, the Department issued a statement that the orangeade ruling applied equally to the carbonated as well as the noncarbonated variety.

The manufacturers of orange concentrates ceased to use color and sold the color to the retail dealers. A letter was sent to the Department of Agriculture, asking for specific records of convictions where "addition of color to conceal inferiority" was the allegation in the complaint. That Department was unable to furnish any record of any such convictions. Some dairymen left the color out of their orangeade and as a result lost business, not only of orangeade but also of milk.

Many hearings were held. All the manufacturers were desirous of having a case tried, but each one preferred to have the case tried against his competitor. The manufacturers of soft drinks desired to have the case tried against the dairy orangeade manufacturers, and the dairy orangeade manufacturers desired to have the case tried against the carbonated orangeade manufacturers because the ruling was first made in the interest of the manufacturers of carbonated beverages.

One case was tried in the Massachusetts courts, resulting in a dismissal. Another case has been secured and will be tried early during the next fiscal year. An attempt will be made to get several cases and have one of the District Attorneys cause an indictment to be secured, and then one case can be selected for trial.

The commercial value of these orangeade preparations is a result of the commercialization of the presence of vitamins in this and other articles. Orange juice is recommended for young people, particularly because of the presence of the C vitamin. The general public cannot differentiate between high and low vitamin material of this character.

The carbonated orangeade preparations contain the least amount of orange juice, and in many instances consist of sugar, carbonated water, together with a little orange oil and occasionally a small amount of orange juice. The concentrates used by the dairymen contain some orange juice and also contain some lemon juice or citric acid. Lemons contain from 6% to 7% of citric acid. Oranges contain about 1% of citric acid. Consequently, one volume of lemon juice diluted to six volumes with a 12% sugar solution can be used as a substitute for six volumes of orange juice, and consequently the dairy preparations are fairly deficient in fruit juice, either orange or lemon.

Orangeade is defined in Webster's dictionary as "orange juice and water." It is defined in the Standard dictionary as "a beverage made of orange juice, sugar, and water." Lemonade is defined as "lemon juice, sugar, and water." There is no standard as to the quantity of fruit used in either of these preparations.

The following table gives the results of the analyses of 18 samples of carbonated orangeade, 16 samples of noncarbonated orangeade, and 20 samples of orange juice prepared in the laboratory.

	Carbonated Orangeade (18 samples)		
	Lowest	Highest	Average
Total solids, %	9.1	14.4	11.76
Acid, %	0.13	0.28	0.18
Ash, %	0.00	0.030	0.019
Vitamin C (mg. per gram)	0.00	0.005	0.009

	Noncarbonated (16 samples)			Orange Juice (20 samples)		
	Lowest	Highest	Average	Lowest	Highest	Average
Total solids, %	10.6	14.8	13.02	9.00	14.07	11.61
Acid, %	0.22	0.43	0.34	0.94	1.33	1.09
Ash, %	0.02	0.11	0.076	0.35	0.51	0.44
Vitamin C	0.01	0.08	0.027	0.44	0.65	0.56

The average carbonated orangeade apparently contains 16% of orange juice, as calculated from the acid and sugar. Calculated from the ash, however, it contains only 2.3% of orange juice, and calculated from the Vitamin C content it contains only 1.6% of orange juice. The market dairy product contains apparently 31% of orange juice calculated from the acid and sugar, but calculated from the ash it contains 17% of orange juice, or, more correctly, total fruit juice, and from the Vitamin C content nearly 5%.

Persons who drink orange juice for its medicinal value should obtain oranges and remove the juice, and in this way be assured of what they are getting. If, however, persons desire this material merely as a beverage which has a satisfactory taste, either the carbonated or noncarbonated material may be chosen, as strikes the fancy.

Of the 8 samples of syrup examined, 5 were adulterated or misbranded. These were syrup concentrates for use in the manufacture of soft drinks and contained sodium benzoate.

There were 24 samples of vinegar examined, of which 2 were below the legal standard for acid.

There were 408 samples of drugs collected and examined, of which 61 were adulterated or misbranded.

Ten samples of argyrol solution were deficient in the active ingredient. The inspectors invariably called for a 15% solution and received solutions varying from 7% up to 18% in concentration.

There were 9 samples of camphorated oil somewhat deficient in camphor, but none sufficiently bad to warrant prosecution. The same may be said of the 3 low standard samples of lime water which were but slightly deficient in lime.

Three samples of rubbing alcohol were declared misbranded as they were made of isopropyl alcohol instead of methyl alcohol. This material came from without the Commonwealth and was subsequently removed from the market.

There were 23 samples of spirit of nitrous ether found to be deficient. A few samples were sufficiently low to warrant prosecution.

There were collected 13 samples of dilute sulphuric acid, of which 11 did not conform to the pharmacopoeia requirements. The pharmacopoeia calls for a concentration of 10%, allowing a variation from 9.5% to 10.5%. These samples varied from 11% to 18% in concentration. Several persons gave as an excuse that in the new pharmacopoeia the material was to be measured and not weighed, and the result of the measurement was somewhat different from the result of weighing. The difference in the concentration between the two methods, however, was extremely slight and did not compare with the enormous difference in the samples collected.

One druggist who has a very fine reputation as a prescription druggist stated that the material had been weighed, but after receiving the hearing notice he examined the scales, called in the Sealer of Weights and Measures, who condemned the scales, and he (the druggist), then destroyed all of the material in the store which he had made up on the defective scales.

Only two samples of caustic poison were collected, one of which was found not to bear the "Poison" label.

A summary of the analyses of drugs will be found in Table 6.

Sanitary inspections made by the Department have materially increased in the past few years. We are using more than the equivalent of two full time men on pasteurization establishments. We are using the equivalent of one full time man on soft drink plants. The equivalent of one full time man is used on ice cream plants and bakeries. In addition, a number of inspections have been made in cheese factories.

It is practically impossible to describe unsanitary conditions in such a manner that the listener can visualize the conditions. Occasionally, an inspector is able to obtain and preserve samples of filth from the plant in question, but even when this filth is shown to a judge he finds it difficult to understand the conditions which existed at the time of the inspector's visit.

Occasionally, judges have continued a case and have looked over a plant. The conditions of the plant at the time are of course much better than they were at the time of the inspector's visit. An example of one such case may be of interest.

A plant engaged in the manufacture of carbonated nonalcoholic beverages was found to be dirty and the proprietor was advised by the inspectors to clean up. About two months later, one of the inspectors in company with another inspector returned to the plant and found it dirty. The proprietor stated that the State men only come around once a year.

The inspector was instructed to again look over the plant and if it were dirty to set a case. At the trial persons working at the plant declared that it was clean, as did the agent of the local board of health. The judge adjourned court, saying that he was going to look over the plant. The inspectors anticipated a telephone call to the plant and went there by automobile and were able to stop the work of several men who were engaged in cleaning up the plant. The judge looked over the plant, came back to court, and imposed the penalty.

About six months later, another inspection was made of the plant and it was found to be clean. One of the employees remarked to the inspector that at the trial the only witnesses who told the truth were the two inspectors.

Nearly all the out of State ice cream plants shipping into Massachusetts have been inspected, and with but few exceptions were found to be operating as provided by the regulations. It has been the custom in granting these permits to accept a photostat copy of the permit of the State where the plant is located as evidence that the place was being operated in a proper manner, and subsequently visits were made both to the frozen dessert plants and the soft drink plants. An inspection made near the close of the fiscal year, however, showed that the reports of inspections of other States were not always to be relied upon. The out of State ice cream plants, however, showed a marked improvement over conditions existing a year ago.

There are 710 pasteurization plants in the State and 1,806 inspections were made of these plants. Most of the plants were inspected at least once. We suspect that approximately 10% of these plants are violating the law by selling

unpasteurized milk as pasteurized and are manufacturing the recording thermometer charts. It is difficult to get evidence of violations of this character, but with a sufficient number of inspections it is inevitable that the inspectors will arrive at the proper time and when the evidence is secured the proprietor of the plant is prosecuted. There was only one such case during the year, but near the end of the year evidence was collected involving two more plants, and cases will be tried in the early part of 1937.

In connection with slaughtering inspection, one of the inspectors visited practically all the local slaughterhouses in the State and also made many investigations in markets. The nominees for the position of inspector of slaughtering, which by law must be submitted each year by local boards of health, except Boston, were investigated when new names were submitted. Many of these persons were approved and those not qualified were disapproved.

One very interesting case was secured, relating to a man who killed animals in two states other than Massachusetts. He would, for example, kill in one state, take the carcass across the line to another state, and a local inspector would stamp it. It would then be brought into Massachusetts for sale.

One case upon which a prosecution was based involved killing in a state other than Massachusetts, taking the dressed carcass to an inspector in that state, having it stamped, and selling it in Massachusetts. This case resulted in a conviction.

The law relating to the sale of wood alcohol was amended by including paint and varnish remover among the material which could be sold without license if more than 3% of wood alcohol were present. There is of course no danger of anybody's consuming the paint remover, which is sufficiently alkaline to seriously attack the mucous membrane of the mouth.

Several letters were sent to local boards of health in the early part of the year, calling attention to the sale of wood alcohol without license. The Department's inspector went to these places again and found in most instances licenses had been secured by the dealers who had been previously warned. The board of health of one city, however, was said to have declined to issue these licenses, telling the vendors that a license was not necessary. These vendors were then prosecuted.

A subsequent investigation in an adjoining town showed that the only dealer in this product in that town had a license. He stated that he went to the local board of health with a newspaper published in the above mentioned city and demanded his license. He got the license although one member of the board of health signed it under protest.

When the cold weather approached in October, there was a different variety of anti-freeze on the market. In the winter of 1935–36, about 90% of the dealers were carrying completely denatured alcohol with or without the anti-rust preparation, which was free from wood alcohol.

About September, the price of wood alcohol dropped and there was a surplus of isopropyl alcohol on the market and mixtures of isopropyl alcohol and wood alcohol began to appear under the same brand names as preparations free from wood alcohol during the previous year. The boards of health were all informed of the composition of these preparations in the monthly news letter sent by this Department, but notwithstanding, when the Department's inspector made investigations he found on the first trip that practically 90% of the dealers in wood alcohol preparations were operating without licenses from their local boards of health, and he also found that approximately 90% of those requiring State licenses had them. A few local boards of health, however, were found to be strictly enforcing the law, including, in the fall of 1936, the board of health responsible for so many prosecutions in the first part of last year.

Many boards of health are granting licenses only to those who voluntarily apply. Dealers have stated that they applied and were told that no license was necessary. Some boards of health were granting licenses to sell denatured alcohol anywhere in Massachusetts, although that particular law has been repealed. Some boards of health granted licenses to sell specific proprietary anti-freeze preparations and some of these licenses were granted for the sale of preparations which did not contain wood alcohol. Some boards granted licenses for fourteen or fifteen

months for a $1 fee. The license fee of $1 is probably too small to warrant the spending of much money for collection. Persons, however, who are licensed to sell this material are more liable to be careful as to whom the material is sold and for what purpose. There have been many deaths in this State from the sale of these wood alcohol preparations under the mistaken notion that they are the same as denatured alcohol.

The police departments submitted 124 samples of drugs, chemicals, and narcotics for analysis, as well as 678 samples of liquor, making a total of 801 such samples. The Department also examined 132 samples of commercial material to ascertain whether or not such material contained wood alcohol.

Mattress Inspection

The chemical work in connection with the examination of mattresses has been materially increased during the past year. As a rule the inspectors brought into the laboratory only such material as they suspected might be other than was represented. In some cases where it was not as represented, no analysis was made as for example, if a mattress were labeled as being stuffed with cotton and it was found to be stuffed with excelsior, placing the sample in evidence was sufficient without any analysis.

There was a total of 173 examinations made under the ultraviolet light. There were 82 samples examined for the determination of the presence of urea. Six samples were examined for the quantity of oil they contained, and the percentage figures were 3, 3.7, 5.0, 5.5, 6.9, and 7.0. In a mattress weighing 50 pounds this represents a considerable quantity of oil. Three samples were found to contain clay, the ash percentages being 25, 28, and 34. On one sample a starch determination was made. This was a sample of white cloth which had been torn down and made into felt.

Microscopic examinations were made of material to ascertain the nature of the fibres used. One sample alleged to be cotton felt was found to contain cotton, wool, hair excelsior and sisal. Another sample alleged to contain hair was found to contain hair, wool, and cotton. Another sample alleged to contain silk was found to be a mixture of silk and rayon or a similar fibre.

The filling used in this class of merchandise is not so bad now as formerly; there are more mixtures of new and secondhand material in place of the former all secondhand material. Employees of the New York Department of Labor, engaged in mattress work, published an article pertaining to the composition of new material used in manufacturing mattresses. One of these employees subsequently testified in a Massachusetts court and upon cross examination stated that the so-called "new" material which he had examined was material furnished by industrial waste dealers and the authenticity of the samples was not investigated further. Under these circumstances, particularly bad secondhand material could masquerade as "new." This case, where the expert testified, resulted in conviction and the payment of a fine.

A case tried in Springfield, involving material which was believed to have been salvaged from the flood, resulted in dismissal by the City of Springfield's prosecuting officer, when the defendant produced this published report of the New York Department, showing the presence of urea in supposedly new material to an extent greater than that found in the mattress in question.

Another case against the same defendant was secured in the Northampton district. This case was tried, resulting in conviction. The case was appealed, and in the Superior Court the defendant paid a $100 fine.

The publication in question claimed that the reaction between the urease and the urea was a reversible reaction, and consequently pure cotton closely associated with cottonseed could contain urea. Experiments made in the laboratory of the Department showed that such is not the case. Cottonseed was found to be free from urease as well as from urea. Known purity cotton and kapok obtained from the unopened pod were found to be free from urea.

Subsequent to the spring flood, inspectors were assigned to the flooded district to engage in the clean-up work and to assist the local authorities. During that period two temporary inspectors were appointed and were used in routine collecting

work in the neighborhood of Boston. In connection with this work the inspectors caused the confiscation of considerable damaged material.

Many of the food warehouses were under water. Many of the bakeries were in a similar condition, and also a few of the milk plants. The employees in one such milk plant, when they ascertained that the flood would inevitably cover the plant, filled the pasteurizing and holding tanks with clean water, sealed them, and removed the motors. In this way the inside of the containers were not polluted and the clean-up work was accomplished more quickly.

One of the bakeries resumed operation before the place was clean and without the consent of the local health officer. This case resulted in a prosecution. In general, however, it was found that these persons were most anxious to clean up the premises, and very few began operating prior to so doing.

One of the cold storage places in Springfield was inundated and the contents of the cold storage compartments were confiscated. The rest of this warehouse contained material not in cold storage, but since the establishment was under U. S. Inspection, it was assumed that the U. S. inspectors would let nothing get into consumption which should be confiscated.

Cold Storage

There were but very few violations of the cold storage law. Requests have been made for a number of extensions of time, and upon those that were granted the reason for the extension was that the articles were in proper condition for further storage.

A summary of these requests and the Department's action thereon will be found in Tables 7, 8, and 9.

In Tables 10, 11, 12, and 13 will be found statistics of quantities of food placed in storage and on hand in storage during the year.

There are many brands of tomato juice on the market and samples of 19 different brands were collected and examined. The examination consisted of a study of the taste and odor of each sample and the determination of the total solids, ash, salt, salt-free ash, reducing sugars and acidity, the latter being expressed as cubic centimeters of tenth normal acid per 100 grams of juice. On account of the color of the material, the chemical method for the determination of vitamin C could not be applied. The difference in taste and flavor was far greater than the difference in chemical composition. The taste and odor were described as excellent, good, and fair in those samples not having any outstanding unusual taste or odor.

One sample reported as having a fair taste but rather flat contained only 0.10% of salt and the largest amount of sugar. One sample reported as tasting slightly acid had a sugar content somewhat above the average and an acidity somewhat above the average. One sample was described as thin with a green tomato taste. This sample had the highest acidity and nearly the lowest sugar content. One sample possessed a distinct taste of rotten tomatoes. This sample had a very high sugar content and a somewhat high acidity. Probably considerable overripe tomatoes were used in the preparation of this sample.

The brand names are not given in the table. Only one sample of each brand was obtained and there is a possibility that the particular sample may not have been representative of all the material sold under that brand name.

Microscopic examination showed that all the samples contained a slight amount of mold spores and more or less skin. They were all, however, found to be free from seed or from excessive quantities of mold.

A summary of the confiscations will be found in Table 14.

In Table 15 will be found a summary of the slaughtering inspections and confiscations.

Table 16 gives a summary of the bakery inspections.

A summary of the liquor report will be found in Table 17.

Analyses of Commercial Tomato Juice

Taste and Odor	Total Solids %	Ash %	Salt %	Salt Free Ash %	Acidity c.c. N/10 Acid per 100 Grams	Reducing Sugars %
Excellent	6.36	1.24	0.76	0.48	67.0	3.29
Good	6.86	1.29	0.82	0.47	67.0	3.69
Good	5.67	0.69	0.30	0.39	70.0	3.32
Fair	7.08	1.12	0.72	0.40	73.0	3.83
Fair	6.39	1.02	0.57	0.47	69.0	3.58
Fair	5.54	1.05	0.64	0.41	59.9	2.85
Fair, rather flat taste	6.69	0.58	0.10	0.48	76.1	4.38
Fair, somewhat sweet	7.09	0.87	0.41	0.46	71.0	4.29
Fair, slightly acid	6.66	0.98	0.50	0.48	76.1	3.65
Fair, somewhat acid, celery flavor	6.10	1.20	0.76	0.44	69.0	3.30
Fair, celery flavor	6.62	1.09	0.62	0.47	79.0	3.68
Fair, very hot	6.13	0.96	0.58	0.38	80.0	3.22
Fair, slightly bitter	6.00	0.87	0.38	0.49	56.8	3.66
Slightly bitter	5.50	1.01	0.58	0.43	64.0	2.80
Strong, unpleasant odor, disagreeable taste	6.54	1.24	0.74	0.50	76.0	3.42
Disagreeable odor and taste	5.61	1.02	0.63	0.39	69.0	2.80
Heavy, disagreeable odor, poor taste	6.54	1.24	0.80	0.44	74.0	3.50
Thin, green tomato taste	4.70	0.95	0.49	0.46	81.2	2.82
Slight taste of rotten tomatoes	7.23	1.08	0.62	0.46	78.1	4.16

Table 1.—*Prosecutions for Violations of the Food and Drug Laws*

For Sale of Milk not of Good Standard Quality

Name	Address	Court	Date	Result
Amrheim, Guy	South Boston	South Boston	Mar. 13, 1936	Conviction
Battaro, Louis	Mattapan	Dorchester	Mar. 12, 1936	Conviction
Bekus, James, and Charles Contas	South Boston	South Boston	Mar. 13, 1936	Conviction
Boura, Angelo	Waltham	Waltham	Jan. 30, 1936	Conviction
Caracostas Brothers, Incorporated	Boston	Boston	July 3, 1936	Conviction
Chronopoulas, George	Boston	Boston	Mar. 10, 1936	Conviction
Crowley, Maria	Boston	Boston	July 22, 1936	– [1]
Gilgun, James J.	Malden	Malden	Apr. 2, 1936	Conviction
Ideal Grill, Incorporated	Boston	Roxbury	Nov. 20, 1936	Conviction
Kirchner, Donald	Pittsfield	Pittsfield	Nov. 24, 1936	Conviction
Kirchner, Donald	Pittsfield	Pittsfield	Nov. 24, 1936	Conviction
Kresge Company, S.S.	Fitchburg	Fitchburg	Dec. 17, 1935	Conviction
Medina, Matias S.	Brockton	Brockton	Jan. 22, 1936	Conviction
Newberry Company, J. J.	Boston	Boston	June 26, 1936	Conviction
Noel, Mrs. Eleanor G.	North Adams	North Adams	July 1, 1936	Conviction
Pedercini, Frank	North Adams	North Adams	June 24, 1936	Conviction
Poleprone, Aristedes	Boston	Boston	Mar. 10, 1936	Conviction
Rose, William	Taunton	Taunton	July 22, 1936	Conviction [2]
Small, Harry	Boston	Roxbury	Nov. 20, 1936	Conviction
Stathacopoulos, Geo.	Boston	Boston	June 5, 1936	Conviction
Stuhler, John	Edgartown	Edgartown	Aug. 4, 1936	Conviction
Walton Lunch Company	Boston	Boston	June 5, 1936	Conviction

For Sale of Milk from which a Portion of the Cream Had Been Removed

Joacquin, John	Fall River	Fall River	Apr. 9, 1936	Conviction
Kirchner, Donald	Pittsfield	Pittsfield	July 1, 1936	Conviction [3]
Kirchner, Donald	Pittsfield	Pittsfield	Nov. 24, 1936	Conviction
Miller, Max	Roxbury	Roxbury	Nov. 20, 1936	Discharged
Shukis, Dominic	Bedford	Concord	Dec. 12, 1935	Conviction

For Sale of Milk containing Added Water

Bashista, Andrew	Westfield	Westfield	Aug. 17, 1936	Conviction
Benedict, William	Fitchburg	Fitchburg	Jan. 3, 1936	Conviction [4]
Burks, Mrs. Leonia	Natick	Natick	Jan. 7, 1936	Discharged
Cabral, Ernest T.	North Westport	Fall River	Jan. 29, 1936	Conviction
Church, George A.	Westville, N. H.	Haverhill	Mar. 6, 1932	– [5]
Fee Company, Henry	Boston	Boston	Nov. 30, 1936	Conviction
Kaszowski, Frank	Dudley	Webster	July 14, 1936	Conviction
Pezold, Arthur	Lynn	Lynn	Feb. 14, 1936	Conviction
Ricker, Moses E.	Rowley	Gloucester	Aug. 1, 1936	Conviction
Ricker, Moses E.	Rowley	Gloucester	Aug. 1, 1936	Conviction
Silva, Antone	North Westport	Fall River	Jan. 29, 1936	Conviction
Smegeil, Frank	Belchertown	Northampton	Sept. 9, 1936	Conviction
Smith, Joseph F.	Lynnfield	Peabody	Jan. 17, 1936	Discharged

For Sale of Milk with a Fat Content Less Than Specified

New England Dairies, Incorporated	Boston	Framingham	Feb. 4, 1936	Conviction
Whiting Milk Companies	Charlestown	Concord	Jan. 6, 1936	Conviction

[1] Dismissed for want of prosecution.
[2] Guilty; placed on probation for two months.
[3] Appealed.
[4] Guilty; placed on probation for one year.
[5] Dismissed for want of jurisdiction.

Prosecutions for Violations of the Food and Drug Laws — Concluded

Representing Unpasteurized Milk as Pasteurized

Schuster, Adam	Roslindale	West Roxbury	July 31, 1936	Conviction

For Violation of Pasteurization Law and Regulations

Hood & Sons, Incorporated, H. P.	Lynn	Lynn	May 21, 1936	Conviction
Iannacci, Mary	Woburn	Woburn	Dec. 31, 1935	Conviction
Iannacci, Mary	Woburn	Woburn	Dec. 31, 1935	Discharged
Lydon, Thomas F.	Woburn	Woburn	Dec. 13, 1935	Conviction
Richardson, Hazen K.	Middleton	Salem	May 22, 1936	Conviction
Schuster, Adam	Roslindale	West Roxbury	July 31, 1936	Conviction
Whitcomb Farms, Incorporated	Littleton	Ayer	July 9, 1936	Conviction
Zervas, George S.	Ipswich	Ipswich	Sept. 12, 1936	Conviction

For Violation of the Milk Grading Regulations

Blanchard, Philip	Worcester	Framingham	Mar. 27, 1936	Conviction
Boutoures, James	Haverhill	Haverhill	Jan. 24, 1936	Conviction
Braley's Creamery, Incorporated	Fall River	Fall River	June 26, 1936	Discharged
Cummings, B. L.	Arlington	Cambridge	Jan. 24, 1936	Conviction
Richardson, Hazen K.	Middleton	Salem	May 22, 1936	Conviction
Zervas, George	Ipswich	Gloucester	Nov. 19, 1936	Conviction

BUTTER
(Below the Legal Standard)

New York Cut Rate Grocers, Inc.	Dorchester	Dorchester	July 20, 1936	Conviction

CHEESE
(Contained Vegetable Gum)

National Creamery Company, Inc.	Somerville	Somerville	Mar. 30, 1936	Conviction [1]
Winer Company, M.	Springfield	Springfield	May 6, 1936	Conviction [1]

For Sale of Adulterated or Misbranded Foods Other Than Milk and Milk Products

HAMBURG STEAK
(Violation of the Law Relative to Use of Sodium Sulphite in Meat and Meat Products)

Baker, Nathan	Haverhill	Haverhill	Jan. 10, 1936	Conviction
Bass, Max	Lynn	Lynn	Apr. 17, 1936	Conviction
Bell, Abraham	South Boston	South Boston	July 8, 1936	Conviction [2]
Berkovitz, Harry	Boston	Boston	Oct. 19, 1936	Conviction
Broadway Market, Incorporated	South Boston	South Boston	Feb. 21, 1936	Conviction
Callahan, William	North Adams	North Adams	Nov. 5, 1936	Conviction
Cionciola, Paul	Boston	Boston	July 31, 1936	Conviction
Cohen, Aaron	Boston	Boston	July 31, 1936	Conviction
Dechter, Joseph M.	Boston	Boston	Mar. 10, 1936	Dismissed
Dechter, Samuel	Boston	Boston	Mar. 20, 1936	Conviction
Diamond, Harry	Boston	Boston	Sept. 2, 1936	Conviction
Epstein, Morris	Roxbury	Roxbury	Nov. 20, 1936	Conviction
Frank, Joseph and John Fontes	Fall River	Fall River	Apr. 9, 1936	Conviction
Freedman, Abraham	Roxbury	Roxbury	Nov. 20, 1936	Conviction
Glickman's Market	Dorchester	Dorchester	Nov. 27, 1936	Conviction
Gomez, Samuel	Lowell	Lowell	July 29, 1936	Conviction
Jamgochian, George	Somerville	Somerville	Jan. 23, 1936	Conviction
Kaller, Phillip	New Bedford	New Bedford	Oct. 16, 1936	Conviction
Kline, Maurice	Dorchester	Dorchester	Nov. 27, 1936	Conviction
Kolovson, Bernard L.	Boston	Boston	Feb. 6, 1936	Conviction
Kronick, Simon	North Adams	North Adams	June 24, 1936	Conviction
Kumin, Louis	Somerville	Somerville	Jan. 23, 1936	Conviction
Mandlebaum, Aaron	Chelsea	Chelsea	Jan. 16, 1936	Discharged
Marienberg, Morris	Boston	Boston	Jan. 15, 1396	Conviction
Most, Max	Boston	Boston	Mar. 10, 1936	Conviction
Nataupsky, George	Chelsea	Chelsea	Jan. 28, 1936	Discharged
Rood, Edward	Boston	Boston	Jan. 23, 1936	Conviction
Rosenburg, Phillip	Dorchester	Dorchester	Oct. 30, 1936	Conviction
Rubin, Morris	Boston	Boston	July 31, 1936	Conviction
Sherman's Markets, Incorporated	North Adams	North Adams	Nov. 19, 1936	Conviction
Snyder, Sarah	Boston	Boston	May 7, 1936	Discharged

MILK
(Misbranded as to Date of Pasteurization)

Griffin, Joseph L.	Jamaica Plain	West Roxbury	Aug. 4, 1936	Discharged
Westwood Farm Milk Company	Jamaica Plain	West Roxbury	July 31, 1936	Conviction

[1] Appealed.
[2] Guilty; placed on probation for 1 year.

For Sale of Adulterated or Misbranded Foods Other Than Milk and Milk Products—Continued

Olive Oil (Adulterated with Cottonseed Oil)				
Ballestracci, Luigi	Worcester	Worcester	May 15, 1936	Conviction
Ballestracci, Luigi	Worcester	Worcester	May 15, 1936	Conviction
Olive Oil (Adulterated with Tea Seed Oil)				
Accardi, Antonio	Boston	Boston	May 4, 1936	Conviction
Accardi, Antonio	Boston	Lawrence	July 24, 1936	Conviction
Accardi, Antonio	Boston	Lawrence	July 24, 1936	Conviction
Accardi, Antonio	Boston	Worcester	July 30, 1936	Conviction
Accardi, Antonio	Boston	Worcester	July 30, 1936	Conviction
Accardi, Antonio	Boston	Worcester	July 30, 1936	Conviction
Booras, Paul	Lynn	Boston	Sept. 30, 1936	Conviction
Caradonna, Jerry	Boston	Salem	May 27, 1936	Conviction
Cosmos Food Stores, Incorporated	Lynn	Lynn	July 13, 1936	Conviction
Cosmos Food Stores, Incorporated	Lynn	Newburyport	July 27, 1936	Conviction
Cosmos Food Stores, Incorporated	Lynn	Newburyport	July 27, 1936	Conviction
Cosmos Food Stores, Incorporated	Lynn	Lawrence	Sept. 23, 1936	Conviction
Cosmos Food Stores, Incorporated	Lynn	Boston	Sept. 30, 1936	Conviction
Lo Conte Brothers, Incorporated	Boston	Boston	Apr. 9, 1936	Conviction
Lo Conte Brothers, Incorporated	Boston	Lawrence	July 24, 1936	Conviction
Lo Conte Brothers, Incorporated	Boston	Lawrence	July 24, 1936	Conviction
Meo, Dominic	Boston	Boston	May 4, 1936	Conviction
Meo, Dominic	Boston	Lawrence	Aug. 28, 1936	Conviction
Previte, Dominic A.	Boston	Worcester	Aug. 6, 1936	Conviction
Ruggiero, Louis	Boston	Boston	May 4, 1936	Conviction
Ruggiero, Louis	Boston	Lawrence	July 24, 1936	Conviction
Ruggiero, Louis	Boston	Worcester	July 30, 1936	Conviction
Ruggiero, Louis	Boston	Worcester	July 30, 1936	Conviction
Olive Oil (Misbranded Oil)				
Accardi, Antonio	Boston	Lawrence	July 24, 1936	Conviction
Accardi, Antonio	Boston	Lawrence	July 24, 1936	Conviction
Accardi, Antonio	Boston	Worcester	July 30, 1936	Conviction
Accardi, Antonio	Boston	Worcester	July 30, 1936	Conviction
Accardi, Antonio	Boston	Worcester	July 30, 1936	Conviction
Ballestracci, Luigi	Worcester	Worcester	May 15, 1936	Conviction
Ballestracci, Luigi	Worcester	Worcester	May 15, 1936	Conviction
Cosmos Food Stores, Incorporated	Lynn	Newburyport	July 27, 1936	Conviction
Cosmos Food Stores, Incorporated	Lynn	Newburyport	July 27, 1936	Conviction
Cosmos Food Stores, Incorporated	Lynn	Lawrence	Sept. 23, 1936	Conviction [1]
Lo Conte Brothers, Incorporated	Boston	Lawrence	July 24, 1936	Conviction
Lo Conte Brothers, Incorporated	Boston	Lawrence	July 24, 1936	Conviction
Meo, Dominic	Boston	Lawrence	Aug. 28, 1936	Conviction
Previte, Dominic A.	Boston	Worcester	Aug. 6, 1936	Discharged
Ruggiero, Louis	Boston	Lawrence	July 24, 1936	Conviction
Ruggiero, Louis	Boston	Worcester	July 30, 1936	Conviction
Ruggiero, Louis	Boston	Worcester	July 30, 1936	Conviction
Orange Beverage (Contained Benzoate not Marked)				
Lovers Leap Company, Incorporated	Lynn	Lynn	Oct. 29, 1936	Dismissed
Snow Crest Beverages, Incorporated	Salem	Salem	Oct. 28, 1936	Conviction
Woolworth Company, F. W.	Boston	Boston	Oct. 22, 1936	Conviction

[1] Appealed.

For Sale of Adulterated or Misbranded Foods Other Than Milk and Milk Products—Concluded

Pickles
(Contained Benzoic Acid)

Berlo, Peter	South Boston	South Boston	May 4, 1936	Conviction
Dwyer, Michael J.	Fall River	Fall River	Mar. 13, 1936	Conviction

Sausage
(Violation of the Law Relative to Use of Sodium Sulphite in Meat and Meat Products)

Alpert, Hyman	Boston	Boston	Jan. 27, 1936	Conviction
Alpert, Nathan M.	Boston	Boston	Jan. 8, 1936	Conviction
Capobiano, Erasmo	Quincy	Quincy	Feb. 19, 1936	Conviction
Carbone, Joseph	Fitchburg	Fitchburg	Sept. 17, 1936	Conviction
Cerqua, Charles	Boston	Boston	Jan. 8, 1936	Conviction
Chaffin, Benjamin	Boston	Boston	Jan. 8, 1936	Conviction
De Rosa, Jerry	Boston	Boston	Sept. 15, 1936	Conviction
Gaeta, John	Boston	Boston	May 14, 1936	Conviction [1]
Giacobbi, Anthony	Boston	Boston	Apr. 22, 1936	Conviction
Gloria Chain Stores, Incorporated	Leominster	Leominster	Nov. 30, 1936	Conviction
Goldberg, Benjamin	South Boston	South Boston	Mar. 5, 1936	Conviction
Goldberg, Max	South Boston	South Boston	Mar. 5, 1936	Dismissed
Gray-United Stores, Incorporated	Boston	Boston	July 31, 1936	Dismissed
Iavazzo, Alphonse	Boston	Boston	Feb. 6, 1936	Conviction
Lagorio, Albert	Dorchester	Boston	July 31, 1936	Conviction
Lombardi, Peter	East Boston	Boston	July 31, 1936	Conviction [2]
Marcello, Anthony	Milford	Milford	Feb. 11, 1936	Conviction
Moro, Nino B.	Milford	Milford	Feb. 28, 1936	Conviction
Phillips, A. H.	Springfield	Springfield	Apr. 1, 1936	Conviction
Sarno, Raffelle	Boston	Boston	July 31, 1936	Conviction
Somers, Nathan	Springfield	Springfield	Mar. 25, 1936	Conviction
Swartz, Lester	Brighton	Brighton	Sept. 24, 1936	Conviction
United Markets, Incorporated	Boston	Boston	Sept. 14, 1936	Discharged

Sausage
(Contained starch in excess of 2 per cent)

Berlo, Peter L.	South Boston	South Boston	Feb. 13, 1936	Conviction [3]
Borowik, Michael	Fall River	Fall River	Jan. 9, 1936	Conviction
Buonaguiro, Pasquale	Boston	Boston	Jan. 8, 1936	Conviction [1]
Buonaguiro, Pasquale	Boston	Boston	Jan. 8, 1936	Conviction
Essem Packing Company	South Lawrence	Lawrence	Jan. 10, 1936	Conviction
Rounsevell, Incorporated, P. W.	Boston	Fall River	Apr. 24, 1936	Conviction

Sausage
(Contained lungs)

Omaha Packing Company, Inc.	Lowell	Lowell	Jan. 31, 1936	— [4]
Savini, Salvatore	Boston	Boston	Mar. 17, 1936	Conviction

For Manufacture of Adulterated Food

Manufacturing Cheese Using Decomposed Butter

Winer, Incorporated, M.	Boston	Boston	Oct. 21, 1936	Discharged

For Sale of Decomposed Food

Butter

Phillips, Incorporated, A. H.	Springfield	Springfield	Dec. 4, 1935	Conviction
Racoff, Bessie	Roxbury	Roxbury	Nov. 20, 1936	Conviction
Wellworth Market, Incorporated	Roxbury	Roxbury	Oct. 30, 1936	Conviction

Eggs

Economy Grocery Stores, Inc.	Dorchester	Dorchester	Dec. 10, 1935	Conviction

[1] Appealed.
[2] Guilty; placed on probation for 6 months.
[3] Guilty; placed on probation.
[4] On file without finding.

For Sale of Decomposed Food — Continued

		HAM		
Chernois, Abraham	Boston	Boston	Sept. 4, 1936	Conviction
		HAMBURG STEAK		
Abrams, Henry	South Boston	South Boston	Feb. 21, 1936	Conviction
Abrams, Henry	South Boston	South Boston	Apr. 23, 1936	Conviction
Abrams, Morris	South Boston	South Boston	Apr. 23, 1936	Conviction
Alpert, Edward	Waltham	Waltham	Sept. 14, 1936	—[1]
Alpert, Edward	Waltham	Waltham	Sept. 14, 1936	—[1]
Alpert, Hyman	Boston	Boston	Aug. 6, 1936	Conviction
Atlantic & Pacific Tea Company, The Great	Gloucester	Gloucester	Dec. 20, 1935	Conviction
Bell, Abraham	South Boston	South Boston	July 8, 1936	Conviction
Berlo, Peter L.	South Boston	South Boston	May 4, 1936	Conviction
Bernstein, Morris	Roxbury	Roxbury	Apr. 6, 1936	Conviction
Black, Abraham	Boston	Boston	Apr. 22, 1936	Conviction
Blasberg, Carl	Boston	Boston	Sept. 16, 1936	Conviction
Cardin, Arthur	Webster	Webster	July 14, 1936	Conviction
Cionciola, Paul	Boston	Boston	July 31, 1936	Conviction
Cohen, Barney	New Bedford	New Bedford	Feb. 12, 1936	Conviction
Cohen, David	Cambridge	Cambridge	Dec. 9, 1935	Conviction
Cohen, Nathan	New Bedford	New Bedford	Oct. 16, 1936	Conviction
Diamond, Harry	Boston	Boston	Sept. 2, 1936	Conviction
Economy Grocery Stores, Incorporated	Boston	Boston	Sept. 15, 1936	Conviction
Ganem, Kamel J.	Lawrence	Lawrence	June 15, 1936	Conviction
Gordon, Samuel	New Bedford	New Bedford	Feb. 7, 1936	Conviction
Gordon, Samuel	New Bedford	New Bedford	Oct. 16, 1936	Conviction
Gray-United Stores, Incorporated	Boston	Boston	July 31, 1936	Dismissed
Gross, Benjamin	Lowell	Lowell	June 26, 1936	Conviction
Hollis, Frank S.	Chelsea	Chelsea	Sept. 1, 1936	Conviction[2]
Kaller, Phillip	New Bedford	New Bedford	Feb. 20, 1936	Discharged
Kaller, Phillip	New Bedford	New Bedford	Oct. 16, 1936	Conviction
Kantor, Abraham	Boston	Boston	May 28, 1936	Conviction
Kawash, Shaheen	Lawrence	Lawrence	June 15, 1936	Conviction
Kenion, Morris	Waltham	Waltham	Sept. 14, 1936	Conviction
Kolovson, Bernard L.	Boston	Boston	Feb. 6, 1936	Conviction
Kronich, Simon	North Adams	North Adams	June 24, 1936	Conviction
Kumin, Louis	Somerville	Somerville	Jan. 23, 1936	Conviction
Kutzenko's Market, Samuel	Springfield	Springfield	Mar. 25, 1936	Conviction
Lamkin, Abraham	Roxbury	Roxbury	Nov. 20, 1936	Conviction
Lipman, Joseph	New Bedford	New Bedford	Feb. 12, 1936	Conviction
Main Public Market, Incorporated	Fall River	Fall River	Oct. 1, 1936	Conviction
Marienberg, Morris	Boston	Boston	Jan. 15, 1936	Conviction
Mohican Market	South Boston	South Boston	May 4, 1936	Conviction
National Cash Market	Holyoke	Holyoke	July 2, 1936	Conviction
New England Market, Incorporated	Cambridge	Cambridge	Jan. 9, 1936	Conviction
Newman, Harry	Boston	Boston	July 16, 1936	Conviction
North End Meat Market, Inc.	Boston	Boston	Sept. 16, 1936	Conviction
People's Public Market, Inc.	Fall River	Fall River	June 12, 1936	Conviction
Pomerantz, Jacob	Indian Orchard	Springfield	Apr. 1, 1936	Conviction
Reinholtz, Incorporated, Joseph	Boston	Boston	Sept. 24, 1936	Conviction
Rood, Edward	Boston	Boston	Sept. 23, 1936	Conviction
Rounsevell, Incorporated, P. W.	Boston	Boston	Sept. 30, 1936	Conviction
Rubin, Morris	Boston	Boston	July 31, 1936	Conviction
Shapiro, Charles	Somerville	Cambridge	Dec. 16, 1935	Conviction
Shuman, David	Boston	Boston	Apr. 22, 1936	Conviction
Skiddell, Edward	South Boston	South Boston	Mar. 5, 1936	Conviction
Slotnick, Ely	Indian Orchard	Springfield	Apr. 1, 1936	Conviction
Snyder, Sarah	Boston	Boston	Aug. 14, 1936	Conviction
Spector, Maurice	Waltham	Waltham	Sept. 14, 1936	Conviction
Stark Supply Company, Incorporated	Roxbury	Roxbury	Apr. 21, 1936	Conviction
Steiman, William	Webster	Webster	July 14, 1936	Dismissed
Sunkist Market, Incorporated	Dorchester	Dorchester	Nov. 27, 1936	Conviction
Swartz, Lester	Brighton	Brighton	Sept. 24, 1936	Conviction
United Markets, Incorporated	Boston	Boston	Sept. 14, 1936	Conviction
United Markets, Incorporated	Boston	Boston	Sept. 24, 1936	Conviction
Vigeant, Valmore	Lowell	Lowell	July 29, 1936	Conviction
Waldman, Sigmund	Roxbury	Roxbury	Apr. 21, 1936	Conviction
Waldman, William	Roxbury	Roxbury	Apr. 21, 1936	Conviction
World Beef Company, Incorporated	Fall River	Fall River	Jan. 9, 1936	Conviction
Yameen, James	Lawrence	Lawrence	June 15, 1936	Conviction

[1] Nol Prossed by District Attorney.
[2] Guilty; placed on probation.

For Sale of Decomposed Food—Concluded

Meat Loaf

Lifshitz, Harry	Roxbury	Boston	Sept. 30, 1936	Conviction

Sausage

Abrams, Morris	South Boston	South Boston	Apr. 23, 1936	Conviction
Alpert, Edward	Waltham	Waltham	Sept. 14, 1936	—[1]
Atlantic & Pacific Tea Company, The Great	Springfield	Springfield	Nov. 4, 1936	Conviction
Berger, Samuel	Salem	Salem	Dec. 17, 1935	Conviction
Carbone, Joseph	Fitchburg	Fitchburg	Sept. 17, 1936	Conviction
Carino, Ernest	Medford	Malden	Mar. 19, 1936	Conviction
Ciotti, Dominick	Malden	Malden	Jan. 9, 1936	Conviction
Cohen, Dave	Cambridge	Cambridge	Jan. 20, 1936	Discharged
Cudahy Packing Company	Lawrence	Lawrence	Sept. 16, 1936	Conviction
De Rosa, Jerry	Boston	Boston	Sept. 15, 1936	Conviction
Dickenson, William	North Adams	North Adams	June 24, 1936	Conviction
Preni, John	Boston	Boston	May 13, 1936	Conviction
Gomez, Samuel	Lowell	Lowell	July 29, 1936	Conviction
Grant Company, W. T.	South Boston	South Boston	Feb. 21, 1936	Conviction
Guylielmo, Pasquale	East Boston	East Boston	Mar. 3, 1936	Conviction
Iavazzo, Alphonse	Boston	Boston	Feb. 6, 1936	Conviction
Lamkin, Abraham	Roxbury	Roxbury	Nov. 20, 1936	Conviction
Marienberg, Morris	Boston	Boston	Jan. 15, 1936	Conviction
North Main Market, Incorporated	Worcester	Worcester	Nov. 19, 1936	Conviction
Peoples Public Market, Inc.	Fall River	Fall River	Oct. 1, 1936	Conviction
Racoff, Hyman	Roxbury	Roxbury	Apr. 21, 1936	Conviction
Shaker, Louis	North Adams	North Adams	Nov. 19, 1936	Conviction
Sherman's Markets, Incorporated	North Adams	North Adams	Nov. 19, 1936	Conviction
Snyder, George	Lynn	Lynn	May 1, 1936	Conviction
Swartz, Lester	Brighton	Brighton	Sept. 24, 1936	Conviction
Tokarsky, Michael	Springfield	Springfield	Mar. 25, 1936	Conviction

Veal

Bornstein, Benjamin	Dorchester	Boston	Jan. 27, 1936	Conviction

False and Misleading Advertising

(Representing eggs which were not fresh as fresh eggs)

Growers Outlet, Incorporated	Greenfield	Greenfield	July 24, 1936	Conviction

Orangeade

(False advertising of orangeade)

Bissell, Frank J.	Holyoke	Holyoke	July 15, 1936	Dismissed

For Violation of Frozen Dessert Law or Regulations Made Thereunder

Campbell, John	Haverhill	Haverhill	Nov. 6, 1936	Conviction [2]
Karampalas, Sarantos	Haverhill	Haverhill	Nov. 6, 1936	Conviction [2]
Lakin's Ice Cream & Sherbet Co., Inc.	Roxbury	Roxbury	June 30, 1936	Conviction
Lathus, Angelina	Haverhill	Haverhill	Nov. 6, 1936	Conviction
Puritan Ice Cream Company, Inc.	Roslindale	West Roxbury	Oct. 16, 1936	Conviction
Reed, Percy G.	Middleboro	Middleboro	Oct. 27, 1936	Discharged

For Violation of Law and Regulations Relative to the Manufacture and Bottling of Carbonated Non-Alcoholic Beverages, Soda Water, Mineral and Spring Water

Operating without Permit

Newall, John Douglas	Bondsville	Palmer	Feb. 26, 1936	Conviction
Daly, John E.	Attleboro	Attleboro	June 15, 1936	Conviction [2]
Dworakowski, Marijan	Easthampton	Northampton	Jan. 29, 1936	Conviction
Dyjak, Anthony	Ludlow	Springfield	Jan. 8, 1936	Conviction
Kuczarski, Frank	Easthampton	Northampton	Jan. 29, 1936	Conviction
Machaj, John	Ipswich	Ipswich	June 6, 1936	Conviction
Matera, Wincenty	Palmer	Palmer	Jan. 17, 1936	Conviction
Niles, Edward	Palmer	Palmer	Jan. 15, 1936	Conviction
Nogg, Walter S.	Palmer	Palmer	Feb. 5, 1936	Conviction
Panesis, James	Hyannis	Barnstable	Oct. 7, 1936	Conviction
Panesis, Peter	Hyannis	Barnstable	Oct. 7, 1936	—[3]
Prondecki, Mrs. Cseslawa	Turners Falls	Greenfield	June 4, 1936	Conviction

Delivering Soft Drink Made Without the Commonwealth By Person Not Having Permit from The Department of Public Health

Greenwood, William	East Pepperell	Ayer	Sept. 16, 1936	Conviction [4]

[1] Nol Prossed by District Attorney.
[2] Appealed.
[3] Dismissed for want of prosecution.
[4] Sentence suspended.

For Violation of Law and Regulations Relative to the Manufacture and Bottling of Carbonated Non-Alcoholic Beverages, Soda Water, Mineral and Spring Water—Con'd

OPERATING A SOFT DRINK PLANT UNDER INSANITARY CONDITIONS

Albert, Robert C.	Beverly	Salem	Sept. 25, 1936	Conviction
Bloomberg, Benjamin	Chelsea	Chelsea	July 23, 1936	Conviction
Borowicz, John	New Bedford	New Bedford	July 10, 1936	Conviction
Brazell, Thomas	Gardner	Gardner	Mar. 12, 1936	Discharged
Cohen, Hyman	Roxbury	Roxbury	May 15, 1936	Conviction [1]
Davis Company, Inc., George A.	Gloucester	Gloucester	Sept. 10, 1936	Conviction
Elk Spring Beverage Company, Inc.	Wakefield	Malden	June 22, 1936	Conviction
General Beverage Corporation	Springfield	Springfield	Nov. 4, 1936	Conviction
Kanter, Samuel	Beverly	Salem	Sept. 25, 1936	Conviction
Lipovsky, Julius	Springfield	Springfield	Nov. 4, 1936	Conviction
Lipovsky, Max	Springfield	Springfield	Nov. 4, 1936	Conviction
Machaj, John	Ipswich	Ipswich	Sept. 4, 1936	Conviction
Millman, Simon S.	Roxbury	Roxbury	May 15, 1936	Conviction [1]
Padgur, Arthur	Boston	Boston	Apr. 3, 1936	Conviction
Pallister Bottling Company, Inc.	Roxbury	Roxbury	July 13, 1936	Conviction
Phillips, Jacob	East Boston	East Boston	June 11, 1936	Conviction
Rapalus, Stanislaus	Ludlow	Springfield	Jan. 8, 1936	Conviction
Shapiro, Charles	Boston	Boston	July 24, 1936	Conviction
Simon, Abraham	Chelsea	Chelsea	July 23, 1936	Discharged
Wojtaszek, Ignatius J.	Adams	Adams	July 17, 1936	Conviction

USING WASH WATER DEFICIENT IN CAUSTIC ALKALI

General Beverage Corporation	Springfield	Springfield	Nov. 4, 1936	Conviction
Lipovsky, Julius	Springfield	Springfield	Nov. 4, 1936	Conviction
Lipovsky, Max	Springfield	Springfield	Nov. 4, 1936	Conviction

For Violation of Sanitary Food Law

Chaney, Irvin W.	Manchester	Salem	Apr. 28, 1936	Conviction
Costa, Nick	East Boston	East Boston	July 10, 1936	Conviction
Costa, Nick	East Boston	East Boston	July 10, 1936	Conviction
Cummings, Arabelle	Swansea	Fall River	Oct. 1, 1936	Conviction
Lathus, Angelina	Haverhill	Haverhill	Nov. 6, 1936	Conviction
Mayflower Creamery Company, Inc.	Boston	Boston	Nov. 20, 1936	Discharged
New York Cut Rate Grocers, Inc.	Dorchester	Dorchester	July 7, 1936	Conviction
Omaha Packing Company, Inc.	Lowell	Lowell	Jan. 31, 1936	— [2]
Rubin, Edwin	Lynn	Lynn	June 5, 1936	Dismissed

For Violation of Bakery Laws

Costa, Dominic H.	Dorchester	South Boston	Sept. 26, 1936	Conviction
Freedman, Carl	Roxbury	Roxbury	Feb. 7, 1936	Conviction
Freedman's Bakery, Incorporated	Roxbury	Roxbury	Feb. 7, 1936	Conviction
Kessler, Harry (3 counts)	New Bedford	New Bedford	June 5, 1936	Conviction
Koza, Joseph	Westfield	Westfield	May 1, 1936	Conviction
Post's Taste-T-Foods, Incorporated	Newton	Newton	Dec. 9, 1935	Conviction
Zemen, Abraham (4 counts)	New Bedford	New Bedford	June 5, 1936	Conviction

For Violation of Laws Pertaining to Sale of Shellfish

DeOrio, Patrick	Revere	Chelsea	Oct. 30, 1936	Conviction
Gorman, King	East Greenwich, R. I.	Boston	Feb. 4, 1936	Conviction
Page, Howard C.	Seabrook, N. H.	Haverhill	June 6, 1936	Conviction
Page, Howard C.	Seabrook, N. H.	Fitchburg	Aug. 10, 1936	Conviction
Smart, Philip	Lynn	South Boston	Jan. 15, 1936	Conviction
First National Store	Amherst	Northampton	Feb. 26, 1936	Conviction
First National Store	Pittsfield	Pittsfield	Feb. 27, 1936	Conviction

For Sale of Drugs Not Conforming to the Requirements of the U. S. Pharmacopoeia

ARGYROL

Di Pietro, William	Milford	Milford	Mar. 11, 1936	Conviction
Letalien, Leo	Fall River	Fall River	Mar. 6, 1936	Conviction
Sinclair, Arthur H.	Salem	Salem	May 5, 1936	Conviction

CAMPHORATED OIL

Karp, Stephen	Cambridge	Cambridge	June 3, 1936	Conviction

SWEET SPIRIT OF NITRE

Amodeo Brothers, Incorporated	Boston	Boston	June 19, 1936	Conviction
Belson, Simon	Dorchester	Dorchester	Apr. 22, 1936	Conviction
Feldman, Solomon J.	Dorchester	Dorchester	Apr. 30, 1936	Conviction
Morse & Sturnick, Incorporated	Boston	Boston	June 30, 1936	Conviction

[1] Appealed.
[2] On file without finding.

For Violation of Law Pertaining to Sale of Methyl or Wood Alcohol

Carlson, John A.	Worcester	Worcester	Dec. 19, 1935	Conviction
Cross, Melvin H.	Worcester	Worcester	Dec. 19, 1935	Conviction
Farrell, John	Worcester	Worcester	Dec. 19, 1935	Conviction
Francesconi, Arminio	Milford	Milford	Jan. 8, 1936	Conviction
Goldman, Charles E.	Norwell	Abington	Jan. 16, 1935	Conviction
Gulf Refining Company	Worcester	Worcester	Dec. 30,1935	Conviction
Kresge Company, S. S.	Greenfield	Greenfield	Mar. 6, 1936	Conviction
Liebman, Louis	South Sudbury	Framingham	Jan. 17, 1936	Conviction
Sears Roebuck & Company	Lynn	Lynn	Dec. 27, 1935	Conviction
Sears Roebuck & Company	Salem	Salem	Jan. 3, 1936	Conviction
Werme, Rudolph O.	Worcester	Worcester	Dec. 19, 1935	Conviction
Westlund, Albert B.	Worcester	Worcester	Dec. 19, 1935	Conviction

For Violation of the Laws Relative to Cold Storage

Selling Cold Storage Eggs without Marking the Container

Economy Grocery Stores, Incorporated	Dorchester	Dorchester	Dec. 10, 1935	Conviction
Racoff, Bessie	Roxbury	Roxbury	Nov. 20, 1936	—[1]

For Violation of the Laws Relative to Slaughtering

Chiatreres, John	Springfield	Springfield	Feb. 3, 1936	Conviction
Chiatreres, John	Springfield	Greenfield	Feb. 7, 1936	Conviction
Cramer, Louis	North Adams	North Adams	Jan. 29, 1936	Conviction
Schott, Joseph	Easthampton	Northampton	May 29, 1936	Conviction
Timberlin, Paul	Pownal, Vt.	North Adams	Aug. 20, 1936	Conviction
Waterman, Albert	Rehoboth	Taunton	Nov. 24, 1936	Conviction
Wright, Allan	Northfield	Greenfield	Mar. 28, 1936	Discharged

For Violation of Law Pertaining to Bedding and Upholstered Furniture

Abramson, Max	Dorchester	Dorchester	Jan. 7, 1936	Conviction
Agonoski, Jennie	Charlestown	Boston	Feb. 12, 1936	Conviction[2]
Bartfield, Isaac	Worcester	Worcester	June 29, 1936	Conviction
Bay State Mattress Company	Roxbury	Dorchester	Oct. 2, 1936	Conviction
Berman, Harry	Beverly	Salem	Mar. 3, 1936	Conviction[3]
Boodman, Abraham	Boston	Boston	Apr. 2, 1936	Conviction[4]
Chair City Upholstering Company	Gardner	Gardner	July 30, 1936	Conviction
Charlestown Furniture Company, Inc.	Charlestown	Charlestown	Apr. 10, 1936	Conviction
Cohen, George	Lynn	Lynn	Dec. 16, 1935	Conviction
Cohen, George	Lynn	Lynn	Oct. 14, 1936	Conviction
Cohen, Samuel	Manchester, N. H.	Gardner	Apr. 9, 1936	Conviction
Diamond Mattress Company, Inc.	Woonsocket, R. I.	Worcester	Apr. 29, 1936	Conviction
Eagle Mattress Company	Boston	Boston	Apr. 2, 1936	Conviction
Eagle Upholstery Company, Inc.	Boston	Boston	Sept. 29, 1936	Conviction
Empire Parlor Furniture Co., Inc.	Roxbury	Roxbury	Jan. 10, 1936	Conviction
Gershman, George	Worcester	Worcester	Jan. 8, 1936	Conviction
Glazer, Hyman	Worcester	Worcester	July 28, 1936	Discharged
Goldstein, Max	Boston	Boston	Jan. 30, 1936	Conviction
Hecht, David	Dorchester	Boston	Dec. 23, 1935	Conviction
Hecht, David	Roxbury	Roxbury	June 5, 1936	Conviction
Hirshberg, Louis A.	Cambridge	Cambridge	Nov. 17, 1936	Conviction
Hub Mattress Company	Boston	Boston	Mar. 13, 1936	Conviction
Hub Mattress Company	Boston	Boston	Mar. 13, 1936	Conviction
Kane Furniture Company	Boston	Boston	Apr. 2, 1936	Conviction
Lanes, Hyman	Lynn	Lynn	Dec. 16, 1935	Conviction
Lanes, Hyman	Lynn	Lynn	Oct. 14, 1936	Conviction
Lanes, Jack	Lynn	Lynn	Dec. 16, 1935	Conviction
Lanes, Jack	Lynn	Lynn	Oct. 14, 1936	Conviction
Lederman, Philip	Beverly	Salem	Mar. 3, 1936	Conviction[3]
Malick, Benjamin	Lynn	Lynn	July 24, 1936	Conviction
Massachusetts Wool Waste Company	Boston	Boston	July 3, 1936	Conviction
Miller, Harry	Lynn	Waltham	Jan. 15, 1936	Discharged
Miller, Harry	Lynn	Lynn	Oct. 14, 1936	Conviction
Miller, Morris	Lynn	Waltham	Jan. 15, 1936	Discharged
Miller, Morris	Lynn	Lynn	Oct. 14, 1936	Conviction
Milstone, Edward	Lawrence	Salem	Oct. 14, 1936	Conviction
Moretsky, Abraham	Chelsea	Chelsea	Feb. 26, 1936	Conviction
Mover, Samuel	Boston	Boston	Apr. 2, 1936	Conviction[4]
National Mattress Company	Boston	Cambridge	Nov. 17, 1936	Conviction
Osiason, Incorporated	Fall River	Fall River	Jan. 16, 1936	Conviction
Rosen, Samuel	Whitman	Abington	May 14, 1936	Conviction
Royal Furniture Manufacturing Co.	Gardner	Gardner	July 30, 1936	Conviction

[1] Dismissed for want of prosecution.
[2] Guilty; placed on probation for two years.
[3] Appealed.
[4] Two months suspended sentence in the House of Correction.

For Violation of Law Pertaining to Bedding and Upholstered Furniture—Concluded

Rubin, Julius	New Bedford	New Bedford	Jan. 14, 1936	Conviction
Schlager, Carl	Malden	Malden	June 16, 1936	Conviction
Selig Manufacturing Company, Inc.	Gardner	Gardner	July 23, 1936	Conviction
Springfield Mattress Company, Inc.	Springfield	Springfield	Feb. 27, 1936	Conviction
Spunt, William	Hyde Park	Brockton	Nov. 24, 1936	Conviction
Standard Mattress Company, Inc.	Springfield	Springfield	May 20, 1936	Discharged
Standard Mattress Company, Inc.	Springfield	Northampton	July 17, 1936	Conviction
Standard Mattress Company, Inc.	Springfield	Northampton	July 17, 1936	Conviction
Stroum, Alexander	Dorchester	Boston	Jan. 3, 1936	Conviction
Weiner, Israel	Lynn	Waltham	Jan. 15, 1936	Conviction
Weiner, Israel	Lynn	Lynn	Oct. 14, 1936	Conviction
Worcester Fibre & Batting Co., Inc.	Worcester	South Boston	May 19, 1936	—[1]
Young Brothers Mattress Co., Inc.	Providence, R. I.	Worcester	Feb. 20, 1936	Conviction
Zanello, James	Plymouth	Plymouth	May 29, 1936	Conviction

Obstruction of an Inspector

Phillips, Jr., A. H.	Springfield	Springfield	Dec. 4, 1935	Conviction

Assault and Battery

Lerner, Louis	Dorchester	Dorchester	Oct. 23, 1936	Conviction

Larceny

Lerner, Louis	Dorchester	Dorchester	Oct. 23, 1936	Conviction

TABLE 2.—*Summary of Milk Statistics*

Number of samples above standard	5,238
Number of samples below standard	724
Total samples	5,962
Number having more than 15% solids	27
Number having between 14% and 15% solids	211
Number having between 13% and 14% solids	1,345
Number having between 12% and 13% solids	3,655
Number having between 11% and 12% solids	653
Number having between 10% and 11% solids	50
Number having between 9% and 10% solids	16
Number of samples below 9%	5
Number of samples showing removal of part of the cream	45
Number of samples showing added water	39

TABLE 3.—*Average Composition of Milk Samples*

	Total Samples Average				Samples not Declared Adulterated Average			
	Number of Samples	Total Solids	Fat	Solids not Fat	Number of Samples	Total Solids	Fat	Solids not Fat
		%	%	%		%	%	%
December	349	12.85	4.02	8.83	344	12.87	4.03	8.84
January	456	12.82	4.00	8.82	447	12.86	4.03	8.83
February	358	12.71	3.96	8.75	347	12.78	4.01	8.77
March	415	12.80	4.00	8.80	414	12.80	4.00	8.80
April	1,090	12.65	4.04	8.61	1,084	12.66	4.04	8.62
May	483	12.62	3.91	8.71	475	12.64	3.93	8.71
June	326	12.58	3.96	8.62	322	12.60	3.98	8.62
July	552	12.33	3.88	8.45	542	12.36	3.90	8.46
August	730	12.44	3.90	8.54	714	12.48	3.92	8.56
September	452	12.75	4.03	8.72	451	12.75	4.03	8.72
October	369	12.80	4.04	8.76	358	12.86	4.08	8.78
November	232	12.77	4.01	8.76	230	12.83	4.03	8.80
Average for Year	5,812	12.57	3.95	8.62	5,728	12.59	3.97	8.62

TABLE 4.—*Summary of Bacteriological Examinations of Milk*

CERTIFIED AND PASTEURIZED MILK

Total samples	61
Samples with count below 50	48
Samples with count below 100	58
Samples with count above 500	1
Lowest count	less than 10
Highest count	590

[1] Dismissed for lack of jurisdiction.

Certified Milk

Total samples		64
Samples with count below 5,000	57	
Samples with count below 10,000	62	
Samples with count above 10,000	2	
Lowest count	600	
Highest count	12,000	

Special Milk Pasteurized

Total samples		15
Samples with count below 5,000	12	
Samples with count above 5,000	3	
Lowest count	200	
Highest count	15,000	

Special Milk Raw

Total samples		35
Samples with count below 25,000	17	
Samples with count below 50,000	31	
Samples with count above 50,000	4	
Lowest count	less than 1,000	
Highest count	670,000	

Grade A Milk Pasteurized

Total samples		358
Samples with count below 10,000	275	
Samples with count above 10,000	83	
Lowest count	less than 100	
Highest count	380,000	
Geometric mean of counts		
December, January and February	5,380	
March, April and May	2,763	
June, July and August	4,764	
October, November and December	3,733	

Grade A Milk Raw

Total samples		147
Samples with count below 50,000	115	
Samples with count below 100,000	138	
Samples with count above 100,000	9	
Lowest count	1,000	
Highest count	370,000	

Pasteurized Milk

Total samples		1,649
Samples with count below 25,000	1,150	
Samples with count below 40,000	1,317	
Samples with count above 40,000	332	
Lowest count	less than 100	
Highest count	1,100,000	
Geometric mean		
December, January and February	11,000	
March, April and May	11,272	
June, July and August	17,620	
September, October and November	12,474	

Raw Milk Sold as Such

Total samples		429
Samples with count below 100,000	322	
Samples with count below 400,000	401	
Samples with count above 400,000	28	
Lowest count	1,400	
Highest count	1,000,000	

Raw Milk to be Pasteurized as Grade A Milk

Total samples		11
Samples with count below 100,000	11	
Lowest count	4,400	
Highest count	38,000	

Raw Milk to be Pasteurized

Total samples		2,583
Samples with count below 100,000	1,744	
Samples with count below 250,000	2,157	
Samples with count below 400,000	2,287	
Samples with count above 400,000	296	
Geometric mean		
December, January and February	50,000	
March, April and May	39,500	
June, July and August	61,800	
September, October and November	32,900	
Total milk samples		5,351
Samples complying with requirements	4,599	
Samples not complying with requirements	752	

Cream

Total samples		36
Samples with count below 100,000	24	
Samples with count above 100,000	12	
Lowest count	1,000	
Highest count	980,000	

Ice Cream

Total samples		952
Samples with count below 100,000	872	
Samples with count above 100,000	80	
Lowest count	less than 1,000	
Highest count	3,300,000	

Sherbet

Total samples		14
Samples with count below 100,000	14	
Lowest count	less than 1,000	
Highest count	20,000	

Meat Samples (Including Samples from the Flooded Area)

Total samples		23
Samples complying with requirements	8	
Samples showing contamination	15	

Miscellaneous Food Samples

Total samples		16
Samples complying with requirements	15	
Samples not complying with requirements	1	

Empty Milk and Soft Drink Bottles

Total bottles examined		58
Bottles found sterile	11	
Bottles found not sterile	47	

Feathers, Secondhand Material, etc.

(Examined in connection with application for license to operate a sterilization plant)

Total samples		39
Samples complying with requirements	35	
Samples not complying with requirements	4	

Total bacteriological examinations		6,489
Samples complying with requirements	5,578	
Samples not complying with requirements	911	

Table 5.—*Summary of Analyses of Food Samples*

Character of Sample	Not Declared Adulterated or Misbranded	Adulterated or Misbranded	Total
Bakery products	10	–	10
Butter	71	40	111
Candy	2	3	5
Celery	–	1	1
Cereals	16	–	16
Cheese	45	77	122
Condensed and evaporated milk	2	–	2
Cream	32	7	39
Dried fruits	2	5	7
Eggs	42	9	51
Fish	–	1	1
Flavoring extracts	20	–	20
Frozen desserts	1,033	–	1,033
Honey	2	–	2
Maple products	7	2	9
Meat products:			
Bacon	5	–	5
Corned beef hash	1	–	1
Chicken	1	–	1
Ham	1	1	2
Hamburg steak	529	146	675
Liver	2	–	2
Meat loaf	–	1	1
Sausages	499	74	573
Stew meat	2	–	2
Miscellaneous	43	8	51
Nuts	8	–	8
Olive oil	118	67	185
Pickles	49	32	81
Salad dressing	1	–	1
Soft drinks	171	128	299
Syrups	3	5	8
Vinegar	22	2	24
Totals	2,739	609	3,348
Alkali solution	28	29	57
Mattress fillings	35	95	130

TABLE 6.—*Summary of Analyses of Drug Samples*

Character of Sample	Not Declared Adulterated or Misbranded	Adulterated or Misbranded	Total
Argyrol solution	79	10	89
Aspirin tablets	2	–	2
Camphorated oil	88	9	97
Hydrogen dioxide	1	–	1
Lime water	16	3	19
Magnesium citrate solution	5	–	5
Olive oil	1	–	1
Proprietary drugs	10	1	11
Rubbing alcohol	2	3	5
Spirit of camphor	10	–	10
Spirit of nitrous ether	112	23	135
Sulphuric acid, dilute	2	11	13
Tincture of ferric chloride	1	–	1
Tincture of iodine	14	–	14
Witch hazel water	1	–	1
Zinc ointment	2	–	2
Caustic poisons	1	1	2
	347	61	408

Summary of Tables 7, 8, 9

Requests for extension of time granted		162
Eggs	30	
Poultry	24	
Meat and meat products	18	
Fish	90	
Requests for extension of time not granted		3
Eggs	2	
Poultry	1	
Articles ordered removed from storage (no requests made)		24
Eggs	4	
Poultry	3	
Meat and meat products	3	
Fish	14	

TABLE 7.—*Requests for Extension of Time Granted on Goods in Cold Storage from December 1, 1935, to December 1, 1936*

(Reason for such extension being that goods were in proper condition for further storage)

Article	Weight (Pounds)	Placed in Storage	Extension Granted to	Name
Eggs, Mixed	10,860	May 17, 1935	Aug. 21, 1936	Armour & Co.
Eggs, Mixed	3,450	April 1, 1935	July 1, 1936	Ganem, Joseph
Eggs, Mixed	11,520	June 15, 1935	Sept. 15, 1936	Smith Co., A. M.
Eggs, Mixed	1,440	May 26, 1935	July 1, 1936	Stone Co., C. H.
Eggs, Mixed	4,890	May 23, 1935	Aug. 1, 1936	Winer Co., William
Sugaryolks	6,600	May 15, 1935	Aug. 31, 1936	Armour & Co.
Sugaryolks	750	April 1, 1935	July 1, 1936	Ganem, Joseph
Sugaryolks	1,394	May 15, 1935	Aug. 15, 1936	Genery Stevens Co.
Sugaryolks	1,020	May 15, 1935	Aug. 15, 1936	Genery Stevens Co.
Sugaryolks	1,020	May 15, 1935	Aug. 15, 1936	Genery Stevens Co.
Egg Whites	26,190	May 21, 1935	Aug. 21, 1936	Armour & Co.
Egg Whites	26,220	May 21, 1935	Aug. 21, 1936	Armour & Co.
Egg Whites	10,500	June 15, 1935	Aug. 31, 1936	Armour & Co.
Egg Whites	900	May 20, 1935	Aug. 22, 1936	Brown & Son, Inc., M.
Egg Whites	2,460	May 24, 1935	Aug. 22, 1936	Brown & Son, Inc., M.
Egg Whites	2,100	April 22, 1935	July 1, 1936	Ganem, Joseph
Egg Whites	5,610	April 27, 1935	June 27, 1936	Hurwitz, H.
Egg Whites	940	May 15, 1935	Aug. 15, 1936	Genery Stevens Co.
Egg Whites	1,980	April 1, 1935	July 1, 1936	Stone Co., C. H.
Egg Whites	1,725	May 23, 1935	*Nov. 1, 1936	Stone Co., C. H.
Egg Whites	12,660	May 1, 1935	Aug. 1, 1936	Swift & Co.
Egg Whites	2,490	May 16, 1935	Aug. 1, 1936	Swift & Co.
Egg Whites	1,710	June 1, 1935	Aug. 1, 1936	Swift & Co.
Egg Whites	14,700	Nov. 15, 1935	Feb. 15, 1937	Wilson & Co.
Whole Eggs	10,860	May 17, 1935	Aug. 21, 1936	Armour & Co.
Whole Eggs	9,000	May 10, 1935	Aug. 1, 1936	Swift & Co.
Whole Eggs	6,000	**Feb. 6, 1936	April 6, 1936	Tranin Egg Products Co.
Egg Yolks	6,000	May 4, 1935	Aug. 31, 1936	Armour & Co.
Egg Yolks	19,050	July 10, 1935	*Mar. 30, 1937	Squire Co., John P.
Egg Yolks	3,060	April 1, 1935	April 30, 1936	Wilson & Co.
Broilers	3,816	Aug. 29, 1935	Feb. 15, 1937	Frosted Food Sales Corp.
Broilers	3,102	Sept. 7, 1935	Mar. 5, 1937	Frosted Food Sales Corp.
Chickens	2,430	Nov. 12, 1935	Feb. 12, 1937	Armour & Co.
Ducklings	521	July 1, 1935	Dec. 20, 1936	Frosted Food Sales Corp.
Ducklings	2,444	July 1, 1935	Dec. 20, 1936	Frosted Food Sales Corp.
Ducklings	510	July 1, 1935	Dec. 20, 1936	Frosted Food Sales Corp.

*The extension granted on this lot was amended before the expiration of the time to which extended. The length of time given includes the total amended period, and the weights given are the initial weights upon which extensions were asked.

**Received frozen and undated.

TABLE 7.—*Requests for Extension of Time Granted on Goods in Cold Storage from December 1, 1935, to December 1, 1936*—Continued

Article	Weight (Pounds)	Placed in Storage	Extension Granted to	Name
Fowl	1,907	Nov. 1, 1935	April 28, 1937	Frosted Food Sales Corp.
Fowl	3,008	Nov. 16, 1935	May 10, 1937	Frosted Food Sales Corp.
Fryers	4,032	Sept. 6, 1935	Mar. 5, 1937	Frosted Food Sales Corp.
Fryers	4,998	Oct. 25, 1935	April 20, 1937	Frosted Food Sales Corp.
Fryers	2,987	Oct. 28, 1935	April 20, 1937	Frosted Food Sales Corp.
Roasters	11,342	Sept. 24, 1935	Mar. 27, 1937	Frosted Food Sales Corp.
Roasters	4,163	Sept. 30, 1935	Mar. 27, 1937	Frosted Food Sales Corp.
Roasters	3,780	Oct. 3, 1935	April 3, 1937	Frosted Food Sales Corp.
Roasters	2,015	Oct. 4, 1935	April 3, 1937	Frosted Food Sales Corp.
Roasters	2,138	Oct. 14, 1935	April 10, 1937	Frosted Food Sales Corp.
Roasters	1,284	Oct. 18, 1935	April 18, 1937	Frosted Food Sales Corp.
Roasters	987	Nov. 1, 1935	April 28, 1937	Frosted Food Sales Corp.
Roasters	2,322	Nov. 7, 1935	Mar. 5, 1937	Frosted Food Sales Corp.
Roasters	1,401	Nov. 16, 1935	May 10, 1937	Frosted Food Sales Corp.
Roasters	1,020	Nov. 20, 1935	May 15, 1937	Frosted Food Sales Corp.
Turkeys	5,296	Nov. 18, 1935	Dec. 31, 1936	Armour & Co.
Turkeys	1,350	Nov. 20, 1935	Dec. 31, 1936	Armour & Co.
Turkeys	12,810	Dec. 4, 1935	April 4, 1937	Berman & Co.
Lamb	5,009	Nov. 9, 1934	*May 16, 1936	Armour & Co.
Lamb	3,658	Nov. 23, 1934	Feb. 15, 1936	Armour & Co.
Lamb	887	Nov. 23, 1934	Feb. 15, 1936	Armour & Co.
Lamb	1,671	Nov. 23, 1934	Feb. 15, 1936	Armour & Co.
Lamb	448	Nov. 23, 1934	Feb. 15, 1936	Armour & Co.
Lamb	786	Nov. 23, 1934	Feb. 15, 1936	Armour & Co.
Lamb	373	Nov. 23, 1934	Feb. 15, 1936	Armour & Co.
Lamb	2,545	Nov. 23, 1934	Feb. 15, 1936	Armour & Co.
Lamb	634	Nov. 23, 1934	Feb. 15, 1936	Armour & Co.
Lamb Chops	2,486	Dec. 20, 1934	Mar. 20, 1936	Frosted Food Sales Corp.
Lamb Legs	11,400	Jan. 2, 1935	April 1, 1936	Frosted Food Sales Corp.
Mutton Saddles	1,120	May 21, 1935	Aug. 15, 1936	Learned Co., S. S.
Pork Chops	3,381	Nov. 11, 1934	Mar. 11, 1936	Frosted Food Sales Corp.
Beef Roasts	2,143	Jan. 21, 1935	April 21, 1936	Frosted Food Sales Corp.
Bull Meat	116,016	Jan. 1, 1935	July 1, 1936	Liberty Beef Co.
Cow Meat	5,550	Nov. 27, 1934	Jan. 27, 1936	Essem Packing Co., Inc.
Rump Steaks	343	Oct. 16, 1935	Dec. 16, 1936	Frosted Food Sales Corp.
Veal Trimmings	1,200	Nov. 28, 1934	Jan. 27, 1936	Essem Packing Co., Inc.
Alewives***	7,765	May 2, 1935	*July 1, 1937	Quincy Mkt. C. S. & W. Co.
Alewives***	6,880	May 3, 1935	*July 1, 1937	Quincy Mkt. C. S. & W. Co.
Alewives***	9,295	May 6, 1935	*July 1, 1937	Quincy Mkt. C. S. & W. Co.
Alewives***	1,930	May 8, 1935	*July 1, 1937	Quincy Mkt. C. S. & W. Co.
Alewives***	6,455	May 9, 1935	*July 1, 1937	Quincy Mkt. C. S. & W. Co.
Alewives***	3,345	May 14, 1935	*July 1, 1937	Quincy Mkt. C. S. & W. Co.
Butterfish	125	Aug. 22, 1935	Jan. 31, 1937	Genoa Fisheries, Inc.
Butterfish	90	Sept. 13, 1935	Oct. 13, 1936	Genoa Fisheries, Inc.
Catfish Fillets	30	May 31, 1935	Sept. 10, 1936	Collins-Lee Co.
Catfish Fillets	160	June 5, 1935	Sept. 10, 1936	Collins-Lee Co.
Catfish Fillets	600	June 20, 1935	Sept. 10, 1936	Collins-Lee Co.
Eels, Sand	550	June 27, 1935	Oct. 31, 1936	Genoa Fisheries, Inc.
Haddock Fillets	180	Nov. 30, 1935	Dec. 30, 1936	Boston Fish Co.
Haddock Fillets	260	Sept. 6, 1935	Oct. 6, 1936	Goodspeed, L. B.
Halibut	1,264	**Feb. 20, 1936	Dec. 31, 1936	Atlantic Halibut Co.
Halibut	3,032	Oct. 14, 1935	Mar. 30, 1937	Atlantic Halibut Co.
Halibut	220	Oct. 14, 1935	Mar. 30, 1937	Atlantic Halibut Co.
Halibut	600	Oct. 14, 1935	Mar. 30, 1937	Atlantic Halibut Co.
Halibut	2,216	Oct. 15, 1935	Mar. 30, 1937	Atlantic Halibut Co.
Halibut	495	June 8, 1935	Dec. 15, 1936	Goodspeed, L. B.
Halibut	430	Aug. 17, 1935	Dec. 28, 1936	Goodspeed, L. B.
Halibut	425	Aug. 17, 1935	Dec. 28, 1936	Goodspeed, L. B.
Halibut	600	Sept. 18, 1935	Jan. 18, 1937	New England Fish Co.
Halibut	2,800	Sept. 18, 1935	Jan. 18, 1937	New England Fish Co.
Halibut	768	Sept. 18, 1935	Jan. 18, 1937	New England Fish Co.
Halibut	1,118	Sept. 18, 1935	Jan. 18, 1937	New England Fish Co.
Halibut	2,774	Sept. 30, 1935	Jan. 30, 1937	New England Fish Co.
Halibut	1,400	Sept. 30, 1935	Jan. 30, 1937	New England Fish Co.
Halibut	949	Oct. 1, 1935	Jan. 7, 1937	New England Fish Co.
Halibut	3,500	Oct. 7, 1935	Jan. 7, 1937	New England Fish Co.
Halibut	4,202	Oct. 19, 1935	Mar. 30, 1937	Rich Co., J. A.
Halibut Steaks	3,110	Aug. 16, 1935	Nov. 15, 1936	Frosted Food Sales Corp.
Herring	25,410	Mar. 6, 1935	*Dec. 30, 1936	Collins-Lee Co.
Herring, Sardine	1,155	Aug. 3, 1935	Jan. 31, 1937	Genoa Fisheries, Inc.
Herring, Sardine	2,000	Oct. 25, 1935	Dec. 18, 1936	Russo & Sons Co.
Mackerel	11,770	June 1, 1935	Dec. 1, 1936	Atlantic & Pacific Fish Co.
Mackerel	33,200	July 19, 1935	Jan. 19, 1937	Atlantic & Pacific Fish Co.
Mackerel	4,229	July 25, 1935	Dec. 25, 1936	Brockelman Bros.
Mackerel	1,400	June 28, 1935	Sept. 28, 1936	Burns Co., John
Mackerel	270	July 18, 1935	Oct. 18, 1936	Burns Co., John
Mackerel***	495	July 12, 1935	Dec. 1, 1936	Genoa Fisheries, Inc.
Mackerel	2,400	June 6, 1935	Dec. 15, 1936	Goodspeed, L. B.
Mackerel	1,050	June 21, 1935	Dec. 15, 1936	Goodspeed, L. B.
Mackerel	350	June 7, 1935	Oct. 6, 1936	Schermerhorn Fish Co.

*The extension granted on this lot was amended before the expiration of the time to which extended. The length of time given includes the total amended period, and the weights given are the initial weights upon which extensions were asked.

**Received frozen and undated.

***Bait.

TABLE 7.—*Requests for Extension of Time Granted on Goods in Cold Storage from December 1, 1935, to December 1, 1936*—Concluded

ARTICLE	Weight (Pounds)	Placed in Storage	Extension Granted to	Name
Mackerel Fillets	105	July 15, 1935	Oct. 18, 1936	Burns Co., John
Mackerel, L. M. & S.	4,645	July 6, 1935	Jan. 7, 1937	Chesebro Bros. & Robbins
Octopus	1,820	**Jan. 28, 1936	Sept. 28, 1936	Busalacchi Bros.
Octopus	750	**Jan. 25, 1936	Dec. 31, 1936	Salem Street Market
Pulpo	2,660	**Jan. 4, 1936	Jan. 1, 1937	Atlantic Coast Fish. Exp. Co.
Pulpo	3,600	**Jan. 31, 1936	Dec. 31, 1936	Corso & Gambino
Salmon	100	April 11, 1936	Feb. 15, 1937	Boston Fish Co.
Salmon, Silver	270	Aug. 10, 1935	Dec. 28, 1936	Goodspeed, L. B.
Scrod, Dressed	415	Jan. 9, 1935	Mar. 31, 1936	Westerbeke, John H.
Scrod Fillets	85	Jan. 9, 1935	Mar. 31, 1936	Westerbeke, John H.
Sepia	6,640	**Dec. 2, 1935	Jan. 1, 1937	Atlantic Coast Fish. Exp. Co.
Shrimp	970	Oct. 18, 1935	Dec. 18, 1936	Russo & Sons Co.
Shrimp	624	Nov. 2, 1935	Jan. 2, 1937	Russo & Sons Co.
Shrimp	1,500	Nov. 15, 1935	Jan. 2, 1937	Russo & Sons Co.
Skate Wings	150	Nov. 21, 1934	Feb. 28, 1936	Puritan Fisheries Co.
Smelts	285	Dec. 28, 1934	Mar. 31, 1936	Foley Co., M. F.
Smelts	195	Dec. 28, 1934	Mar. 31, 1936	Foley Co., M. F.
Smelts	75	Dec. 31, 1934	Mar. 31, 1936	Foley Co., M. F.
Smelts	480	Dec. 31, 1934	Mar. 31, 1936	Foley Co., M. F.
Smelts	315	Jan. 11, 1935	Mar. 1, 1936	Foley Co., M. F.
Smelts	150	Jan. 16, 1935	Mar. 1, 1936	Foley Co., M. F.
Smelts	350	Jan. 24, 1935	Mar. 1, 1936	Foley Co., M. F.
Sole Fillets	340	Sept. 24, 1935	Oct. 24, 1936	Goodspeed, L. B.
Sole, Lemon	260	June 26, 1935	Dec. 26, 1936	Goodspeed, L. B.
Squid	575	May 31, 1935	Nov. 30, 1936	Atwood & Co.
Squid	523	June 3, 1935	Nov. 30, 1936	Atwood & Co.
Squid	3,164	June 4, 1935	Dec. 4, 1936	Atwood & Co.
Squid	1,655	June 4, 1935	Dec. 4, 1936	Atwood & Co.
Squid	543	June 6, 1935	Dec. 9, 1936	Atwood & Co.
Squid	1,577	June 7, 1935	Dec. 9, 1936	Atwood & Co.
Squid	648	June 12, 1935	Dec. 9, 1936	Atwood & Co.
Squid	3,200	May 20, 1935	Nov. 20, 1936	Russo & Sons Co.
Squid	4,780	May 25, 1935	Nov. 25, 1936	Russo & Sons Co.
Squid	1,250	May 27, 1935	Nov. 27, 1936	Russo & Sons Co.
Squid	3,515	May 27, 1935	Nov. 27, 1936	Russo & Sons Co.
Squid	1,942	May 27, 1935	Nov. 27, 1936	Russo & Sons Co.
Squid	2,700	May 29, 1935	Nov. 30, 1936	Russo & Sons Co.
Squid	2,875	May 31, 1935	Nov. 30, 1936	Russo & Sons Co.
Squid	2,500	June 1, 1935	Dec. 3, 1936	Russo & Sons Co.
Squid	3,900	June 3, 1935	Dec. 3, 1936	Russo & Sons Co.
Squid, Bone	19,404	May 24, 1935	Aug. 15, 1936	Atlantic Coast Fish. Corp.
Squid, Bone	2,479	May 13, 1935	Nov. 30, 1936	Commonwealth Ice & C. S. Co.
Squid, Bone	8,950	May 19, 1935	Nov. 30, 1936	Commonwealth Ice & C. S. Co.
Squid, Bone	10,580	May 22, 1935	Nov. 30, 1936	Commonwealth Ice & C. S. Co.
Squid, Summer***	1,195	**Feb. 28, 1936	Nov. 30, 1936	Mantia & Sons, John
Whiting, Round	1,770	Nov. 13, 1934	Feb. 28, 1936	Puritan Fisheries Co.

**Received frozen and undated.
***Bait.

TABLE 8. — *Requests for Extension of Time Not Granted on Goods in Cold Storage from December 1, 1935, to December 1, 1936*

Article	Weight (Pounds)	Placed in Storage	Name
Sugaryolks	6,180	June 1, 1934	Tranin Egg Products Co.
Egg Whites	247	June 19, 1935	Frigid Food Products, Inc.
Fryers	2,026	Aug. 24, 1935	Frosted Food Sales Corp.

TABLE 9. — *Articles Which Had Been in Cold Storage Longer Than Twelve Months, and on Which No Requests for Extensions Had Been Made, Ordered Removed, from December 1, 1935, to December 1, 1936.*

Article	Weight (Pounds)	Placed in Storage	Name
Egg Whites	2,250	*July, 3, 1936	Brown & Son, Inc., M.
Egg Whites	540	Sept. 7, 1935	Land O'Lakes Cry., Inc.
Egg Whites	1,350	*Mar. 31, 1936	Tranin Egg Products Co.
Whole Eggs	540	May 4, 1935	Armour & Co.
Broilers	210	Aug. 1, 1935	Rosoff, T.
Broilers	220	Aug. 1, 1935	Rosoff, T.
Chickens	100		Green, Henry W.
Beef Livers	100	Aug. 15, 1935	Handschumacher Co.
Beef Trimmings	1,700	Nov. 8, 1935	Essem Packing Co.
Pork	125	Oct. 17, 1935	Burton, P. F.
Eels, Sand	880	Oct. 29, 1935	Busalacchi Bros.
Eels, Sand	160	Oct. 30, 1935	Busalacchi Bros.
Halibut	220	July 20, 1935	Atlantic Coast Fisheries Corp.
Halibut	335	Oct. 15, 1935	Goodspeed, L. B.
Halibut, S. & M.	345	Oct. 31, 1935	Goodspeed, L. B.
Herring, Sardine	60	Oct. 29, 1935	Atlantic Coast Fisheries Corp.
Mackerel	3,415	June 15, 1935	Ganem's Market
Mackerel	1,050	July 5, 1935	Goodspeed, L. B.
Mackerel	1,318	July 20, 1935	Goodspeed, L. B.
Mackerel	263	June 14, 1935	Palermo Fish Co.
Salmon, Dr. King	587	July 5, 1935	Goodspeed, L. B.
Sole Fillets	165	Nov. 15, 1935	Goodspeed, L. B.
Whiting, Round	176	Oct. 19, 1935	Gorton, J. B.
Whiting, Round	208	Nov. 6, 1935	Gorton, J. B.

*Received frozen and undated.

TABLE 10.—*Articles Other Than Fish Placed in Cold Storage from December 1, 1935, to December 1, 1936*

	Butter (lbs.)	Eggs (Dozens)	Broken-out Eggs (lbs.)	Broilers (lbs.)	Roasters (lbs.)	Fowls (lbs.)	Turkeys (lbs.)	Ducks (lbs.)	Miscellaneous Poultry (lbs.)	Beef (lbs.)	Pork (lbs.)	Lamb and Mutton (lbs.)	Miscellaneous Meats (lbs.)
December	453,055	247,290	537,557	262,601	1,123,096	247,731	1,856,782	44,679	311,911	1,031,293	677,735	42,202	692,575
January	298,710	121,500	444,245	171,845	755,167	322,763	602,464	18,356	316,424	643,018	1,109,339	39,313	931,661
February	169,968	28,170	508,410	56,476	180,490	105,802	389,224	11,545	149,733	484,300	1,402,560	76,804	559,139
March	391,315	720,300	651,576	90,016	260,361	141,667	225,606	8,324	272,987	483,527	454,022	53,788	453,753
April	507,608	2,512,080	1,082,615	102,376	365,074	83,515	264,204	7,363	183,416	614,593	420,764	37,165	552,149
May	1,204,804	3,373,680	1,685,687	125,579	261,403	205,161	281,700	45,943	218,321	585,653	1,000,623	31,579	736,226
June	3,987,552	1,092,570	1,078,280	87,556	221,411	351,249	409,047	121,164	377,695	738,258	1,177,023	26,345	763,855
July	2,217,840	1,107,630	1,518,827	304,136	137,519	258,727	285,619	240,427	312,226	833,746	916,654	68,990	574,797
August	963,837	343,620	961,519	357,234	138,195	536,640	228,664	169,468	172,484	1,028,809	1,005,227	113,239	815,807
September	1,000,590	408,750	904,259	710,011	311,508	324,576	118,577	143,097	267,146	794,313	1,153,659	135,269	801,001
October	803,260	941,280	838,765	670,507	589,657	338,234	97,228	33,868	343,031	1,264,138	285,168	282,965	866,599
November	311,426	84,540	691,329	411,671	863,189	440,929	1,097,261	34,423	370,699	1,176,476	1,310,402	235,987	937,612

TABLE 11.—*Articles Other Than Fish on Hand in Cold Storage on the First Day of the Month, from January 1, 1936, through December 1, 1936*

	Butter (lbs.)	Eggs (Dozens)	Broken-out Eggs (lbs.)	Broilers (lbs.)	Roasters (lbs.)	Fowls (lbs.)	Turkeys (lbs.)	Ducks (lbs.)	Miscellaneous Poultry (lbs.)	Beef (lbs.)	Pork (lbs.)	Lamb and Mutton (lbs.)	Miscellaneous Meats (lbs.)
January	2,008,059	744,120	1,945,045	1,033,315	2,641,402	377,832	2,469,911	401,437	439,890	2,654,434	1,719,960	291,500	1,241,079
February	1,162,268	185,850	1,697,996	1,035,242	2,965,056	567,345	2,733,712	172,651	602,098	2,504,389	2,513,549	243,145	1,160,668
March	763,729	1,920	1,261,479	902,250	2,566,600	398,940	2,593,034	54,702	515,903	2,007,106	3,051,642	225,821	696,036
April	332,467	672,270	1,010,701	661,530	2,203,824	189,915	2,404,964	26,331	452,783	1,828,480	2,701,364	195,146	660,371
May	259,083	3,012,330	1,172,680	512,673	1,780,903	96,833	1,934,381	27,982	344,172	1,482,997	2,642,577	56,679	667,229
June	946,635	6,193,710	1,895,467	430,155	1,353,729	171,165	1,764,214	51,097	330,941	1,369,961	2,416,408	42,206	672,287
July	4,437,979	7,043,940	1,924,059	325,473	1,060,902	341,634	1,743,049	150,957	533,001	1,444,739	2,397,312	36,785	816,276
August	5,356,857	7,570,230	2,512,814	434,772	721,262	419,987	1,549,366	378,532	565,432	1,613,520	2,070,971	55,273	758,045
September	4,966,487	6,728,760	2,421,860	648,063	451,541	718,752	1,146,223	514,490	441,017	1,903,382	1,054,415	111,028	892,810
October	4,666,766	5,396,100	2,367,713	1,273,327	534,961	788,201	709,192	643,279	470,548	1,976,865	1,242,843	148,257	833,438
November	4,200,304	4,132,230	2,157,328	1,865,472	965,154	868,466	386,604	663,752	686,176	2,374,124	1,108,319	321,065	876,686
December	3,387,601	1,770,420	1,844,795	2,119,657	1,695,174	1,143,191	1,084,331	567,072	863,668	2,880,283	1,517,630	418,852	1,104,761

TABLE 12.—*Fish Placed in Cold Storage from December 15, 1935, to December 15, 1936*

	Bluefish (lbs.)	Butterfish (lbs.)	Catfish (lbs.)	Ciscoes (lbs.)	Cod, Hake, Pollock and Haddock (lbs.)	Flounders (lbs.)	Haddock Fillets (lbs.)	Halibut (lbs.)	Herring (lbs.)	Mackerel (lbs.)	Fall and Silver Salmon (lbs.)	Salmon all Others (lbs.)	Shad (lbs.)	Smelts, Eulachon, etc. (lbs.)	Squid (lbs.)	Whitefish (lbs.)	Whiting (lbs.)	Miscellaneous Frozen Fish (lbs.)
January	638	784	4,007	1,700	1,456,068	38,780	976,736	106,759	151,425	68,903	86,972	22,865	–	148,073	42,760	27,970	682,390	876,004
February	2,750	286	4,490	–	233,125	34,060	1,042,850	146,227	149,640	32,285	83,086	3,212	80	254,072	50,920	1,570	43,455	420,509
March	3,882	3,965	5,275	–	613,175	41,865	2,544,265	179,197	95,115	39,573	57,654	2,532	555	653,484	28,625	–	3,000	626,688
April	160	125	85,079	1,300	1,706,449	39,990	3,383,945	47,311	400,290	30,085	36,422	21,150	60	78,741	–	100	28,890	846,914
May	3,784	790	70,981	–	2,426,922	77,790	3,326,375	90,354	585,950	581,135	6,810	33,900	915	5,895	460,308	2,745	183,745	1,739,416
June	6,300	68,594	23,730	7,550	1,720,831	64,504	2,432,151	64,494	625,775	2,163,167	9,739	4,116	13,509	365	630,472	–	5,363,743	1,585,034
July	3,347	11,244	3,523	9,690	1,945,411	11,165	2,394,995	38,770	101,940	2,950,529	46,975	27,544	184,049	554	345,351	–	9,561,867	1,828,652
August	75,276	21,828	4,064	16,685	2,364,982	19,098	2,416,766	47,323	113,718	782,302	34,461	12,357	60,485	790	354,339	1,000	6,871,930	2,122,236
September	10,461	100,627	3,004	3,820	2,106,364	30,635	2,765,692	38,891	68,658	553,651	3,655	1,185	3,410	30,650	114,969	5,330	4,670,783	1,183,796
October	2,160	39,763	4,156	2,250	2,750,203	38,927	2,760,523	35,909	714,943	370,983	11,509	7,500	470	80,598	66,600	1,720	1,648,981	2,270,325
November	1,679	13,878	1,200	365	4,495,399	28,738	1,385,793	125,078	662,466	340,311	51,604	5,028	12,632	10,886	58,541	2,490	886,239	2,948,763
December	5,453	11,537	180	–	4,614,797	46,836	876,992	108,685	105,730	16,572	57,331	8,682	4,238	18,338	76,614	9,724	404,829	3,049,142

TABLE 13.—*Fish on Hand in Cold Storage on the Fifteenth Day of the Month, from January 15, 1936, through December 15, 1936*

	Bluefish (lbs.)	Butterfish (lbs.)	Catfish (lbs.)	Ciscoes (lbs.)	Cod, Hake, Pollock and Haddock (lbs.)	Flounders (lbs.)	Haddock Fillets (lbs.)	Halibut (lbs.)	Herring (lbs.)	Mackerel (lbs.)	Fall and Silver Salmon (lbs.)	Salmon all Others (lbs.)	Shad (lbs.)	Smelts, Eulachon, etc. (lbs.)	Squid (lbs.)	Whitefish (lbs.)	Whiting (lbs.)	Miscellaneous Frozen Fish (lbs.)
January	15,761	50,901	69,924	8,676	4,360,714	133,013	2,064,528	199,141	634,994	5,024,256	166,355	41,964	41,842	156,061	1,036,682	28,011	3,162,109	3,499,712
February	9,526	20,044	67,720	5,039	1,780,153	92,863	1,093,266	183,107	453,878	3,400,881	170,679	35,546	27,219	335,434	817,642	12,339	1,960,740	1,839,134
March	7,657	10,402	71,757	2,154	440,995	76,934	1,448,866	191,840	198,626	1,526,053	148,705	23,957	22,419	852,665	546,843	6,493	644,151	896,424
April	3,695	1,890	60,083	2,724	1,005,216	56,143	2,510,980	131,892	359,468	386,465	56,055	21,376	10,681	725,727	224,582	–	64,327	770,136
May	6,675	1,243	123,324	1,414	2,118,324	112,884	3,281,880	199,102	771,185	788,392	11,393	42,729	9,865	693,266	550,867	2,745	115,032	1,541,035
June	3,797	66,248	119,395	8,964	2,415,070	149,100	3,437,729	211,323	1,269,015	2,629,235	10,064	21,807	21,644	668,884	1,144,909	2,745	4,077,075	1,952,772
July	3,596	72,583	96,515	18,654	3,368,505	122,702	3,812,875	231,351	1,109,946	5,470,576	20,919	33,210	203,377	656,392	1,351,145	2,745	10,671,764	2,655,868
August	78,557	85,636	88,000	33,774	3,566,239	108,861	3,840,981	255,627	888,740	6,084,845	43,566	38,059	257,781	645,250	1,499,592	2,855	13,665,167	3,395,626
September	85,859	175,899	80,476	37,414	3,685,172	110,899	4,401,756	251,161	654,557	6,352,932	32,588	33,525	259,198	636,083	1,347,749	2,975	15,004,940	3,584,298
October	73,803	202,970	64,956	37,494	4,546,092	88,441	4,513,284	227,302	1,045,778	5,595,764	23,496	35,997	228,062	630,847	1,030,583	3,665	13,844,716	4,210,993
November	38,058	183,067	43,468	28,164	6,843,898	74,313	2,563,746	279,278	1,373,117	4,958,521	51,563	35,454	214,377	484,237	937,909	5,335	12,554,507	5,700,834
December	35,212	160,995	40,944	17,799	9,165,079	96,043	1,839,034	244,872	1,122,257	4,126,152	84,442	33,799	174,845	284,201	750,270	13,323	11,766,199	7,307,987

Table 14.—*Confiscations*

In Warehouses

Butter	250 bxs.	Contaminated by flood
Butter	864 lbs.	Contaminated by flood
Butter	480 lbs.	Contaminated by flood
Eggs	72 crates	Contaminated by flood
Eggs, Frozen	100 lbs.	Contaminated by flood
Poultry	2,337 lbs.	Contaminated by flood
Poultry	130 lbs.	Decomposed
Beef	9,779 lbs.	Contaminated by flood
Beef	2,386 lbs.	Decomposed
Beef Livers	195 lbs.	Dried out
Veal	851 lbs.	Contaminated by flood
Pork	77,885 lbs.	Contaminated by flood
Pork	614 lbs.	Unstamped
Liverwurst	6 lbs.	Decomposed
Pigs Feet	125 lbs.	Decomposed
Bonita Fillets	675 lbs.	Rancid
Butterfish	625 lbs.	Decomposed
Flounder Fillets	150 lbs.	Decomposed
Perch, Sea	2,890 lbs.	Decomposed
Perch, Sea	580 lbs.	Decomposed
Cheese	1,500 lbs.	Contaminated by flood
Miscellaneous	250 lbs.	Decomposed
Oleomargarine	720 lbs.	Contaminated by flood

In Stores, Markets, Etc.

Butter	420 lbs.	Contaminated by flood
Butter	15 lbs.	Contaminated by flood
Butter	Unknown	Contaminated by flood
Eggs	Unknown	Contaminated by flood
Beef	3,945 lbs.	Contaminated by flood
Beef	7,515 lbs.	Contaminated by flood
Veal	40 lbs.	Decomposed
Veal	24 lbs.	Underweight
Veal	25½ lbs.	Underweight
Veal	22 lbs.	Underweight
Veal	23 lbs.	Underweight
Lamb	40 lbs.	Decomposed
Miscellaneous:		
Bacon	10 lbs.	Contaminated by flood
Frankforts	90 lbs.	Decomposed
Meat Loaf	4 lbs.	Decomposed
Mixed Meat	175 lbs.	Contaminated by flood
Mixed Meat	150 lbs.	Contaminated by flood
Sausage	9 lbs.	Decomposed
Sause	15 lbs.	Decomposed
Miscellaneous Groceries:		
Bananas	Unknown	Contaminated by flood
Bread	Unknown	Contaminated by flood
Bread Dough	400 loaves	Contaminated by flood
Cakes	Unknown	Contaminated by flood
Cheese	Unknown	Contaminated by flood
Cheese, Farmer	165 lbs.	Contaminated
Chocolate Liquor	100 lbs.	Contaminated by flood
Cocoa	40 lbs.	Contaminated by flood
Cocoa	81 lbs.	Contaminated by flood
Corn Meal	1 bbl.	Contaminated by flood
Cream	10 jars	Contaminated by flood
Flour	37 bags	Contaminated by flood
Flour	2½ bbls.	Contaminated by flood
Horse Radish	Unknown	Contaminated by flood
Lard	30 lbs.	Contaminated by flood
Lard	Unknown	Contaminated by flood
Maple Sugar	1 box	Contaminated by flood
Mixed Groceries	5 tons	Contaminated by flood
Oleomargarine	Unknown	Contaminated by flood
Oranges	Unknown	Contaminated by flood
Pastry	Unknown	Contaminated by flood
Peas	30 lbs.	Contaminated by flood
Potatoes	Unknown	Contaminated by flood
Raisins	Unknown	Contaminated by flood
Vegetables	Unknown	Contaminated by flood
Whole Wheat Flour	Unknown	Contaminated by flood
Milk Caps	500	Contaminated by flood
10 Quart Paper Containers	144	Contaminated by flood

Total Confiscations:

116,008½ lbs.
251 boxes
400 loaves
144 containers
500 milk caps

72 crates
10 jars
5 tons
37 bags
3½ barrels

TABLE 15.—*Slaughtering Report from December 1, 1935, through November 30, 1936*

Total number of carcasses inspected			144,142
Cattle	24,406	Hogs	43,484
Calves	70,217	Sheep	6,035
Total number of carcasses condemned			1,514
Cattle	133	Hogs	297
Calves	1,078	Sheep	6

REASONS FOR CONDEMNATION	Cattle	Calves	Hogs	Sheep	Totals
Immaturity	–	926	–	–	926
Cholera	–	–	149	–	149
Died otherwise than by slaughter	20	102	11	–	133
Tuberculosis	29	2	31	1	63
Pneumonia	9	2	47	–	58
Emaciated	15	11	19	–	45
Bruised or injured	4	15	15	5	39
Septicemia	18	–	10	–	28
Multiple abscesses	6	1	5	–	12
Fetus	–	11	–	–	11
Septic metritis	6	–	–	–	6
Icterus	1	3	2	–	6
Peritonitis	6	–	–	–	6
Tumor	5	–	–	–	5
Acute inflammation	3	–	–	–	3
Slaughtered illegally	–	1	2	–	3
Milk fever	3	–	–	–	3
Pyemia	1	–	1	–	2
Mange	–	–	2	–	2
Nephritis	1	1	–	–	2
Pleurisy	1	–	1	–	2
Liver trouble	–	–	1	–	1
Caseus lymphodenitis	1	–	–	–	1
Embolism	–	1	–	–	1
Mastitis	1	–	–	–	1
Poisoned	1	–	–	–	1
Rupture	–	–	1	–	1
Purulent pericarditis	1	–	–	–	1
Inflation of carcass with air	–	1	–	–	1
Enteritis	–	1	–	–	1
Ascites	1	–	–	–	1
Totals	133	1,078	297	6	1,514

TABLE 16.—*Summary of Inspections of Bakeries Made by the Division*

Number of bakeries inspected		731
Number of defects found as follows:		
Floors not properly constructed or maintained	69	
Walls not properly constructed or maintained	105	
Ceilings not properly constructed or maintained	89	
Storage facilities not properly constructed or maintained	24	
Apparatus not properly constructed or maintained	73	
Stock not properly protected	51	
Products not properly protected	56	
Flies abundant	14	
Flour storage unsatisfactory	34	
Tobacco used in bakery	40	
Absence of garbage can	58	
Domestic rooms connected with bakery	13	
Miscellaneous defects	198	
Total defects		824

TABLE 17.—*Liquor Report for 1936*
Character of Samples

CITIES AND TOWNS	Beer	Cider	Wine	Distilled Spirits	Extracts	Alcohol	Miscellaneous	Total
Arlington	7	–	2	6	–	1	–	16
Boston	13	–	3	111	–	34	2	163
Cambridge	4	–	5	37	–	–	–	46
Dedham	4	–	6	–	–	1	–	11
Fall River	–	–	–	11	–	–	–	11
Groton	12	–	2	7	–	–	–	21
Lawrence	1	–	1	14	–	5	–	21
Lowell	2	–	–	8	–	8	–	18
Lynn	4	–	2	9	–	–	–	15
Springfield	3	–	–	34	–	3	–	40
Waltham	8	–	–	2	–	6	–	16
Alc. Bev. Con. Com.	41	–	1	140	–	6	–	188
Dept. Public Safety	10	–	2	9	–	2	–	23
Miscellaneous*	20	–	1	65	–	11	1	98
Total	129	–	25	453	–	77	3	687

*From 28 towns submitting less than ten samples each.

REPORT OF THE MINIMUM WAGE COMMISSION

James T. Moriarty, *Chairman;* Henry D. Chadwick, M. D.
Walter V. McCarthy
Mary E. Meehan, *Executive Secretary*

(Chapter 430, Acts of 1936, June 25, 1936–November 30, 1936)

Outline of Functions

The duties of the Minimum Wage Commission under the law comprise the following functions: Investigating the wages of women and minors in occupations where there is reason to believe that the wages of a substantial number are below the requirement of healthful living; establishing wage boards to recommend minimum rates for women and minors; entering wage board orders based on the recommendations of the boards; inspecting to determine compliance with the orders and decrees; reconvening wage boards to meet the changes in cost of living; and publishing the names of employers found violating its decrees or orders.

Introduction

The Uniform Minimum Wage law, effective September 12, 1934, continued in operation until June 25, 1936, when an emergency measure, Chapter 430 of the Acts of 1936, was passed and signed by the Governor of the Commonwealth. This act was considered essential to prevent substantial injury to the public welfare; to provide the necessary protection to women and minors engaged in industry in this Commonwealth; and to preserve health, safety and convenience.

The text of the new law is practically the same as Chapter 308, which was in effect in 1934 and 1935. However, the administration of the work in connection with minimum fair wage rates for women and minors is now under the jurisdiction of the Minimum Wage Commission functioning under the Department of Public Health. The Commission is composed of three members, namely:—The Commissioner of Labor and Industries, who acts as chairman; the Commissioner of Public Health, and the Commissioner of Public Welfare. Following is a brief summary of the duties and functions of the Minimum Wage Commission:—

1. The Minimum Wage Commission or its authorized agent is given authority to make an investigation of wages paid to women and minors and examine the records of the employer; or it may require the employer to furnish in writing under oath the desired information relative thereto.
2. On the petition of 50 or more residents, it is the duty of the Commission to make an investigation of the wages paid to such employees, and if, on such information the Commission is of the opinion that a substantial number of women and minors in any occupation are receiving what is termed "oppressive and unreasonable wages," it may appoint a wage board.
3. After the Commission, in the performance of its duties, has formed a wage board and approved its report, it makes what is known as a "directory order," making such rates minimum fair wage rates in this occupation, including administrative regulations submitted therewith by the Commission.

   Note. It will be here noted that the word "*decree*" is no longer used in the law, the Commission issuing what is known as a "directory order" establishing fair minimum wage rates.
4. Later, if the Commission has reason to believe that any employer in this occupation is not complying with the order, he may summons such employer to appear and show why he should not be published for such failure, and if found not to be complying, may cause publication to be made.
5. After a directory order has been in effect for at least nine months, the Minimum Wage Commission may, if in its opinion "the persistent non-observance of such order by one or more employers is a threat to the maintenance of fair minimum wage standards in any occupation," after notice and a public hearing, make such order mandatory and failure thereafter to comply with the order subjects the employer to punishment by fine or imprisonment or both.

6. If a wage board is appointed by the Commission in an occupation and upon receipt of the report of this board, if not satisfactory, it may be recommended to the same board or a new board established. If accepted, it is published and a public hearing held. After the hearing the Commission may again recommend it to the Board or establish a new wage board; but if the report is approved, it is declared a "directory order."
7. The Commission has the additional duty and authority to accompany such report with administrative regulations. This is a new provision.
8. The Commission has authority to issue special licenses to employees whose earning capacity is impaired by age, physical or mental deficiency, or injury.
9. After a directory order has been in effect for one year, The Minimum Wage Commission may on its own motions and shall on petition of 50 or more residents reconvene the same board or establish a new board in order to review the existing wages.
10. The Minimum Wage Commission is also authorized to revise the administrative regulations of any order.

With the enactment of Chapter 430, the administration of the minimum wage work was immediately transferred to the new Commission. By this statute their powers were greatly increased by vesting them with authority to inflict the following penalties:—

Penalties under the Law

Sec. 22 (1) "Any employer and his agent, or the officer or agent of any corporation, who discharges or in any other manner discriminates against any employee because such employee has served or is about to serve on a wage board or has testified or is about to testify before any wage board or in any other investigation or proceeding under or related to this chapter or because such employer believes that said employee may serve on any wage board or may testify before any wage board or in any investigation or proceeding under this chapter shall be punished by a fine of not less than fifty nor more than two hundred dollars."

(2) "Any employer or the officer or agent of any corporation who pays or agrees to pay to any woman or minor employee less than the rates applicable to such woman or minor under a mandatory minimum fair wage order shall be punished by a fine of not less than fifty nor more than two hundred dollars or by imprisonment for not less than ten nor more than ninety days or by both such fine and imprisonment, and each week in any day of which such employee is paid less than the rate applicable to him under the mandatory minimum fair wage order and each employee so paid less shall constitute a separate offence."

(3) "Any employer or the officer or agent of any corporation who fails to keep the records required under this chapter or to furnish such records to the commission or any of its authorized representatives upon request shall be punished by a fine of not less than twenty-five nor more than one hundred dollars, and each day of such failure to keep the records requested under this chapter or to furnish same to the commission or any of its authorized representatives shall constitute a separate offence."

OUTLINE OF ACTIVITIES

New Wage Boards

During the year the Commission completed the work of 3 wage boards initiated the previous year, namely—those for the Boot and Shoe Cut Stock and Findings, Electrical Equipment and Supplies and Retail Store industries. The recommendations of these boards became effective on March 1, May 1, and October 1, 1935, respectively. Wage Boards were also formed for the Brush, Candy, Corset, Men's Clothing and Raincoat, Men's Furnishings, Muslin Underwear, and Women's

Clothing industries. These boards have all submitted their reports and they have been accepted by the Minimum Wage Commission, with the exception of the Muslin Underwear board. The Minimum Wage Commission rejected this report, for they felt that the employee members had not been adequately represented at the meetings of the board. Membership for a new board under this occupation is being formed at the present time. The rates for experienced employees, as well as learners and apprentices, special provisions, and definitions as determined by the Boards, will be found later in this report.

Advertisement of Non-Compliances

By reason of the fact that during the greater part of the year the Commission was revising boards to bring the existing decrees under the provisions of the new law, it was not found advisable to resort to publication.

Inspections

Inspections have been initiated and completed under the following decrees: Bread and Bakery Products; Brush; Canning and Preserving and Minor Lines of Confectionery; Corset; Druggists' Preparations, Proprietary Medicines and Chemical Compounds; Electrical Equipment and Supplies; Men's Clothing and Raincoat; Men's Furnishings; Office and Other Building Cleaners; Paper Box; Pocketbook and Leather Goods; Stationery Goods and Envelopes; and Toys, Games and Sporting Goods. In the case of Electrical Equipment and Supplies; Jewelry and Related Lines; Knit Goods; Laundry and Dry Cleaning; Men's Furnishings; Stationery Goods and Envelopes; and Toys, Games and Sporting Goods, the inspection started last year was completed, in addition to the new inspection which was initiated this year.

Reinspections also have been made under the majority of these decrees for the purpose of checking up to see whether the employers had fulfilled their obligations to meet compliance as promised, following complaints.

As a result of the inspections throughout the year, home work has been found in 15 firms under 9 decrees, covering 165 records of employees.

In the regular inspection work, wage records were secured for 42,866 women and minors in 1,647 establishments. In addition, 8,474 reinspections were taken under 18 decrees, including 210 establishments. This, with the inspection of home work just referred to, makes a total of 51,505 records secured in 1,872 firms.

Reinspection of Inspection Cases

Disposition of Cases of Non-compliance Pending from Previous Years

(See Table 1)

At the beginning of the fiscal year there were outstanding as appears from the report of the previous year, 9,619 cases of non-compliance in 960 establishments. A large number of these cases come under the Retail Store directory order with 3,949 cases in 579 establishments, and Electrical Equipment and Supplies directory order with 1,103 cases in 33 establishments.

Adjustments.—The Commission has been reasonably successful in securing adjustments, and in many cases where compliance was not secured, substantial increases in wage rates were made. Wages were raised to meet the provisions of the decrees and directory orders in 668 cases in 56 establishments. Adjustments by change of work, hours or method of payment, whereby the employees were enabled to earn the minimum, were made in 264 cases in 27 establishments. There were 28 employees in 4 establishments covered by the piece rate ruling, and in 1,204 cases in 92 establishments it was reported that the employees had left, been laid off or discharged. Ten establishments with 50 employees were reported as out of business, and 71 cases in 4 establishments were incorrectly recorded. Adjustment was reported or promised in 136 cases in 14 establishments. Two cases in two establishments were recorded as special license type, and 7 cases of technical non-compliance were found in 2 establishments.

Cases pending.—There were outstanding at the close of the year 6,086 cases in 805 establishments, mainly under the Boot and Shoe Cut Stock and Findings and Retail Store directory orders and the Muslin Underwear and Men's Furnishings decrees. In connection with the Electrical Equipment and Supplies occupation,

the 1,103 cases in 33 establishments, pending from previous years, were absorbed by the inspection under Directory Order No. 2, which became effective on May 1, 1936.

Disposition of New Cases Found in Firms with Cases Outstanding from Previous Years

(See Table 2)

In the course of reinspection of firms with cases outstanding from previous years, 1,108 new cases were found in 50 establishments. The majority of these cases came under the Jewelry and Related Lines, Muslin Underwear, and Men's Furnishings decrees. The remaining cases were under the Boot and Shoe Cut Stock and Findings, Bread and Bakery Products, Knit Goods, Paper Box, Stationery Goods and Envelopes; and Toys, Games and Sporting Goods decrees.

Adjustments.—As many of these cases were in establishments where compliance had never been secured, the Commission faced difficulties in endeavoring to secure adjustments. In 14 cases in one establishment wages were raised to meet the provisions of the decree. Eighty employees in 5 firms were reported as left, laid off or discharged; 7 employees in 1 establishment came under the special license provision; 8 employees in 1 establishment were adjusted by changing their work, hours or method of payment; and adjustment was promised or reported for 4 employees in 2 establishments.

Cases pending.—There were pending at the close of the year 995 cases in 49 establishments, mainly under the Jewelry and Related Lines, Men's Furnishings and Muslin Underwear decrees. Other cases were found under the Boot and Shoe Cut Stock and Findings; Bread and Bakery Products; Knit Goods; Paper Box; Stationery Goods and Envelopes; and Toys, Games and Sporting Goods decrees, as well as under the Retail Store directory order.

Disposition of Cases in the Regular Inspection Work

(Table 3)

In the regular inspection work, 3,934 cases of non-compliance were found in 228 establishments, thus representing a decided improvement over that of the past as to number of cases; and it is to be further noted that in most instances it represents compliance with the recommended rates.

Adjustments.—In the cases settled, wages were raised for 252 women in 57 establishments. Adjustment by change of work, hours or method of payment, whereby the employees were enabled to earn the minimum, were made in 75 cases in 19 establishments. Adjustment was promised or reported in 723 additional cases in 134 establishments. There were 24 employees in 4 establishments who came under the piece rate ruling. This ruling provides that, in cases of experienced operators where the great majority are earning the minimum or over, the rates are considered to be in accordance with the decree. In 2 establishments, 6 employees were covered by the special license provision. In 176 cases in 52 establishments, it was reported that the employees had left, were laid off or were discharged. One establishment employing six women was reported as out of business. Seventy-five cases in 10 establishments were incorrectly recorded.

Cases Pending.—At the close of the year there were pending in the regular inspection work 2,597 cases in 160 establishments.

Conclusion

The Commission has been effective in maintaining the standard included in the various wage decrees and directory orders, and to this extent has a report of progress. There is, however, much work to be done to bring under the provisions of the law industries which are still outside its jurisdiction, and the coming year will witness efforts in this direction.

Appeal should be made to the legislature to make the law firmer in its application, and there should be constant striving towards an effective mandatory law in Massachusetts.

It is very gratifying to note that under the new orders which have been recently established, there seems to be a spirit of cooperation in meeting the requirements. This is especially noticeable in regulations covering chain stores, many of whom have not complied in the past.

COMMONWEALTH OF MASSACHUSETTS

Minimum Wage Commission

Electrical Equipment and Supplies Occupation

Directory Order No. 2

Minimum Fair Wage Standard for Women and Minors Employed in This Occupation

Basic Wage Rates:

1. No women or minors employed in the Electrical Equipment and Supplies industry shall be paid less than the following rates:
   1. For women of ordinary ability, not less than 35 cents per hour.
   2. For beginners, irrespective of age, not less than 30 cents per hour.

Special Provisions:

1. Piece rates: The wages paid piece workers shall be so adjusted that every woman or minor so employed shall earn for any given period of employment not less than the time wages herein prescribed for such period.
2. Waiting time: Time during which employees are required to wait on employer's premises and no work is provided by the employer, shall be counted as working time and paid for at the individual worker's regular wage rate.

Definitions:

1. Electrical Equipment and Supplies Occupation:

   The above named occupation covers the manufacture of such products as incandescent lamps, electric-lighting accessories, radios, radio parts, mica, insulated wire, fuses, signal and protective systems, and various kinds of electrical appliances and devices for household and office use. It is represented by such products as telephone cords, fire-alarm apparatus, electric-light sockets, automobile lighting fixtures, spark plugs, electric irons and similar devices.
2. Employees of Ordinary Ability: Employees, irrespective of age, who have worked in the industry six months, three months of which were in a particular factory; provided that an employee who has not been employed in the occupation eight months or more and who returns to work in a factory where he or she has been previously employed, may be rated as a beginner for a period of not more than one month.
3. This order shall become effective on May 1, 1936.

Electrical Equipment and Supplies Wage Board

List of Members

Representative of the Public

Professor Arthur N. Holcombe, *Chairman*, 20 Berkeley Street, Cambridge

Representing the Employers:

W. G. Mitchell
General Electric Company
River Works
Lynn

William L. Muenter
United American Bosch Company
Springfield

Tobe Deutschmann
Tobe Deutschmann Company
Canton

Representing the Employees:

Mrs. Florence B. Patterson
Hygrade Sylvania Lamp Co.
Salem

Miss Gladys F. Fenton
Warren Telechron Co.
Ashland

Matthew Campbell
Westinghouse Electric Co.
Springfield

COMMONWEALTH OF MASSACHUSETTS

Minimum Wage Commission

Retail Store Occupation

Directory Order No. 3

Minimum Fair Wage Standards for Women and Minors Employed in This Occupation

Basic Wage Rates:

1. No woman or minor employed in retail stores shall be paid less than the following rates for a full working week:

	Class A	*Class B*	*Class C*
1. Experienced workers . .	$14.50	$14.00	$13.50
2. Inexperienced Workers:			
a. Less than 1 year's experience or less than 19 years of age .	13.50	13.00	12.50
b. Under 18 years of age .	12.50	12.00	12.00

2. These rates shall represent the minimum fair wage rates to be paid a full-time employee. An employee regularly employed for 36 hours per week or over shall be regarded for the purpose of this order as a full-time employee.

Special Provisions:

1. Workers who are employed for a less number of hours than that required of full-time women workers shall be paid at a rate per hour not less than that proportion of the full-time minimum fair wage which the number of hours for which such short time workers are employed bears to the number of hours per week required of full-time women workers.
2. Waiting time: Time during which employees are required to wait on the employer's premises and no work provided by the employer shall be counted as working time and paid for at the individual worker's regular wage rate.

Definitions:

1. Retail store occupation:
The above-named occupation includes all women and minors employed in retail establishments, unless and until their specific employment is governed by a minimum fair wage order, decree or ruling other than this general retail store decree.
2. Classification of communities: The Minimum Wage Commission has adopted a classification of communities by population groups, as in the recent Code, though fewer divisions. In the schedule adopted, Class A is placed with over 500,000 population (Boston); Class B is cities and towns under 500,000 and over 30,000 population; Class C is all smaller communities.
3. Employees of ordinary ability: An experienced employee is one not less than nineteen years of age who has had one year's experience (not necessarily continuous nor for the same employer) in the occupation.
4. This order shall become effective on October 1, 1936.

Retail Store Wage Board

List of Members

Representative of the Public

LaRue Brown, Esq., *Chairman*, 185 Devonshire Street, Boston

Representatives of Employers:
William H. Bixby
Superintendent of Personnel
William Filene's Sons Company
Boston

Representatives of Employees
Miss Bessie E. Macgibbon
46 Keeley Street
Haverhill

Charles A. Whipple
President, Parke-Snow Company
Waltham

Edward A. Buttner
President, Buttner Company
Plymouth

Miss Helen Thompson
29 Montgomery Street
Lawrence

William Hutchinson
49 Grampian Way
Dorchester

COMMONWEALTH OF MASSACHUSETTS

Minimum Wage Commission

Boot and Shoe Cut Stock and Findings Occupation

Directory Order No. 4

Minimum Fair Wage Standards for Women and Minors Employed in This Occupation

Basic Wage Rates:

1. For women and minors of ordinary ability, not less than $14.70 a week.
2. For employees who have had less than three months' experience, not less than $12.00 a week.
3. These rates are based on full-time work by which is meant the full number of hours required by employers and permitted by the laws of the Commonwealth.

Special Provisions:

1. Piece rates: The wages paid piece workers shall be so adjusted that every woman or minor so employed shall earn for any given period of employment not less than the time wages herein prescribed for such period.
2. Waiting time: Time during which employees are required to wait on the employer's premises and no work is provided by the employer, shall be counted as working time and paid for at the individual worker's regular wage rate.

Definitions:

1. Boot and Shoe Cut Stock and Findings Occupation:
   The above-named occupation comprises the manufacture of such products as counters, innersoles, shoe trimmings and ornaments, stays, wood and leather heels, shanks, rands and similar lines.
2. Employees of ordinary ability: Employees who have had three months' or more experience in the industry.
3. This order shall become effective on March 1, 1937.

Boot and Shoe Cut Stock and Findings Wage Board

List of Members

Representative of the Public

Prof. Carroll W. Doten, *Chairman*, 68 Garfield Street, Cambridge

Representatives of the Employers:

James Christie
Hamilton Wade Company
Brockton

Edwin C. Cotton
Renton Heel Company
Lynn

Arthur A. Mullins
Nat'l Assn. of Wood Heel Mfgrs.
Haverhill

Representatives of the Employees:

Miss Frances Cook
Haley-Cate-Rockwood Company
Everett

Mr. Galen Bumpus
C. S. Pierce Co.
Brockton

Eugene Goyette
5 Hilldale Avenue
Haverhill

COMMONWEALTH OF MASSACHUSETTS

Minimum Wage Commission

Men's Clothing and Raincoat Occupation

Directory Order No. 5

Minimum Fair Wage Standards for Women and Minors Employed in This Occupation

Basic Wage Rates:

1. No woman or minor employed in the men's clothing and raincoat occupation shall be paid less than the following rates:

Men's and Boys' Wool Clothing Division:

1. For women or minors of ordinary ability, 40 cents an hour for a 36-hour week.
2. Learners and apprentices:
   From 3 to 9 months' employment, $12 for a 36-hour week.
   From 1 to 3 months' employment, $ 9 for a 36-hour week.

Any time worked over 36 hours shall be considered overtime and shall be paid for at a pro rata rate of the minimum to which the individual is entitled.

Raincoats, Mackinaws, Melton and Leather Jackets, Cotton Slacks, Ski Suits, and All Other Branches Division:

1. For women or minors of ordinary ability $14.50 for a week of 40 hours.
2. Learners and apprentices:
   From 3 to 9 months' employment, $12 for a 40-hour week.
   From 1 to 3 months' employment, $ 9 for a 40-hour week.

Any time worked over 40 hours shall be considered overtime and shall be paid for at a pro rata rate of the minimum to which the individual is entitled.

Special Provisions:

1. Piece rates: The wages paid piece workers shall be so adjusted that every woman or minor so employed shall earn for any given period of employment not less than the time wages herein prescribed for such period.
2. Waiting time: Time during which employees are required to wait on the employer's premises and no work is provided by the employer, shall be counted as working time and paid for at the individual worker's regular wage rate.

Definitions:

1. Men's Clothing and Raincoat Occupation:
   The above-named occupation includes all women and minors employed in the men's clothing and raincoat industry. The Men's and Boys' Wool Clothing Division includes men's and boys' suits, topcoats, overcoats, and single wool pants. All Other Branches include raincoats, work clothing, mackinaws, cotton slacks, leather and melton jackets, and ski suits.
2. Employees of ordinary ability: An experienced employee is one who has had at least nine months' experience in the occupation.
3. This order shall become effective on March 1, 1937.

Men's Clothing and Raincoat Wage Board

List of Members

Representative of the Public

Charles S. Ramsay, Esq., *Chairman*, 73 Tremont Street, Boston

Representing the Employers:
Mr. Fred Monosson
Cosmopolitan Mfg. Company
Cambridge

Representing the Employees:
Mr. James Barker
Waterproof Garment Workers
Boston

Mr. Julius Morse
Leopold Morse Company
Boston

Mr. Jacob Blume
Amalgamated Clothing Workers
Boston

Mrs. Daisy Wolf
Asinoff Mfg. Company
Chicopee

Mr. Salvatore Zammitti
Hygrade Clothing Company
Boston

THE COMMONWEALTH OF MASSACHUSETTS

Minimum Wage Commission

Candy Occupation

Directory Order No. 6

Minimum Fair Wage Standards for Women and Minors Employed in This Occupation

Basic Wage Rates:

1. No woman or minor employed in the candy occupation shall be paid less than the following rates for a full working week of 48 hours:
   1. Experienced Workers:
      For women or minors of ordinary ability, $14.40 for a full working week and not less than 30 cents per hour.
   2. Inexperienced Workers:
      a. From six months' to a 1 year's employment, $12 for a full working week and not less than 25 cents per hour.
      b. Less than six months' experience, $9.60 for a full working week and not less than 20 cents per hour.

Special Provisions:

1. Piece rates: The wages paid piece workers shall be so adjusted that every woman or minor so employed shall earn for any given period of employment not less than the time wages herein prescribed for such period.
2. Waiting time: Time during which employees are required to wait on the employer's premises and no work is provided by the employer, shall be counted as working time and paid for at the individual worker's regular wage rate.

Administrative Regulations

Definitions:

1. Candy Occupation: Any activity concerned with the manufacture of candy and confections by or on behalf of any person, firm, corporation, association, or other institution including any such activity performed by or for the employer upon his or its behalf and for his, or its own purposes or for others.
2. Employees of ordinary ability: An experienced employee is one who has had at least one year's experience in the occupation.
3. Full time week: Any week of 48 hours shall be considered a full working week.
4. Minors: Employees of either sex under 21 years of age.
5. Employees: Women and minors employed in the Candy Occupation.

Candy Wage Board

List of Members

Representative of the Public

Professor Cornelius S. Donoghue, *Chairman*, Holy Cross College, Worcester

Representatives of Employers:
Miss Rose Fenochetti
W. F. Schrafft & Sons Corp.
529 Main Street
Charlestown

Representatives of Employees:
Miss Mary J. Leary
Gobelin Company, Inc.
253 Norfolk Street
Cambridge

Mr. Harry Achorn
New England Confectionery Co.
254 Massachusetts Avenue
Cambridge

Mr. Henry Sharaf
The Sharaf Company, Inc.
16 New Street
East Boston

Miss Madeline McCory
Daggett Chocolate Company
408 Main Street
Cambridge

Miss Mary A. Nestor
Durand Company
40 Ames Street
Cambridge

THE COMMONWEALTH OF MASSACHUSETTS

Minimum Wage Commission

Men's Furnishings Occupation

Directory Order No. 7

Minimum Fair Wage Standards for Women and Minors Employed in This Occupation

Basic Wage Rates:

1. No woman or minor employed in the men's furnishings industry shall be paid less than the following rates:
   1. Experienced Workers: Not less than $14 per week or 35 cents per hour.
   2. Inexperienced Workers:
      a. From three to six months' experience, not less than $10 per week or 25 cents per hour.
      b. Less than three months' experience, not less than $8.50 per week or 21¼ cents per hour.
2. An employee regularly employed for 40 hours per week or over shall be regarded for the purpose of this order as a full-time employee.

Special Provisions:

1. Piece rates: The wages paid piece workers shall be so adjusted that every woman or minor so employed shall earn for any given period of employment not less than the time wages herein prescribed for such period.
2. Waiting time: Time during which employees are required to wait on the employer's premises and no work is provided by the employer, shall be counted as working time and paid for at the individual worker's regular wage rate.

Administrative Regulations

Definitions:

1. Men's Furnishings Occupation:
   The above-named occupation includes the manufacture of such products as overalls, work shirts, work pants, garters, suspenders, dress shirts, neckwear, collars, underwear and pajamas.
2. Experienced employees: An experienced employee is one who has had at least six months' experience in the occupation.
   a. In the event a worker, having had at least three months' experience in any plant and having transferred into another line of work, that employee may be classified as semi-skilled.
   b. Experienced employees coming from an outside plant are subject to the semi-skilled class for not exceeding three months.
   c. In the event a worker has been away from the industry for a period of three years or more, regardless of her prior skill, re-enters the industry as a semi-skilled worker.
3. Minors: Employees of either sex under 21 years of age.
4. Employees: Women and minors employed in the Men's Furnishings Occupation.

MEN'S FURNISHINGS WAGE BOARD

List of Members

Representative of the Public

Mr. Sol. C. Hamburger, *Chairman*, 260 Tremont Street, Boston, Massachusetts

Representatives of Employers:

Mr. Robert M. Craig
H. M. Sawyer Company
20 Thorndike Street
Cambridge

Mr. W. Karl Lations
Lations Manufacturing Co.
40 Jackson Street
Worcester

Mr. Louis L. Yamins
Essex Manufacturing Co.
18 Pocasset Street
Fall River

Representatives of Employees:

Miss Josephine Pecarni
H. Hoffman & Company
Orleans & Porter Streets
East Boston

Miss Bertha Zepf
Trade School for Girls
Fenway
Boston

Mr. Thomas Flavell
Amalgamated Clothing Workers
304 South Main Street
Fall River

THE COMMONWEALTH OF MASSACHUSETTS

MINIMUM WAGE COMMISSION

BRUSH OCCUPATION

Directory Order No. 8

Minimum Fair Wage Standards for Women and Minors Employed in This Occupation

BASIC WAGE RATES:

No woman or minor employed in the brush occupation shall be paid less than the following rates:

(a) For an experienced employee, not less than 32½ cents per hour.
(b) For learners and apprentices, not less than 24 cents per hour.

SPECIAL PROVISIONS:

1. Piece rates: The wages paid piece workers shall be so adjusted that every woman or minor so employed shall earn for any given period of employment not less than the time wages herein prescribed for such period.
2. Waiting time: Time during which employees are required to wait on the employer's premises and no work is provided by the employer, shall be counted as working time and paid for at the individual worker's regular wage rate.

ADMINISTRATIVE REGULATIONS

DEFINITIONS:

1. Brush Industry:
   The above-named occupation includes the manufacture of any type of brush in the Commonwealth.
2. Employees of ordinary ability: An experienced employee is one who has had six months' employment in the occupation.
3. Employees: Women and minors employed in the brush occupation.
4. Minors: Employees of either sex under 21 years of age.

BRUSH WAGE BOARD

List of Members

Representative of the Public

Harry Silver, Esquire, *Chairman*, 53 State Street, Boston

Representatives of Employers:

Mr. Abraham Furst
American Brush Company
511 Warren Street
Roxbury

Representatives of Employees:

Mrs. Mary Corbett
J. C. Pushee & Sons
3 Randolph Street
Boston

Mr. C. W. F. Ramus
Ramus Brush Company
Winthrop Center

Mr. Arthur O. Nuttleman
Prophylactic Brush Company
Pine Street
Florence

Mr. Claude Peake
DuPont Viscoloid Company
511 Lancaster Street
Leominster

Mrs. Christine O. Hill
Hygenia Brush Company
9 May Street
Worcester

THE COMMONWEALTH OF MASSACHUSETTS

Minimum Wage Commission

Women's Clothing Occupation

Directory Order No. 9

Minimum Fair Wage Standards for Women and Minors Employed in This Occupation

Basic Wage Rates:

1. For women and minors of ordinary ability, not less than 35 cents per hour.
2. For learners and apprentices, not less than 25 cents per hour for the first 36 weeks' experience, regardless of the number of places of employment at which they have worked in the industry.

Special Provisions:

1. Piece rates: The wages paid piece workers shall be so adjusted that every woman or minor so employed shall earn for any given period of employment not less than the time wages herein prescribed for such period.
2. Waiting time: Time during which employees are required to wait on the employer's premises and no work is provided by the employer, shall be counted as working time and paid for at the individual worker's regular wage rate.

Administrative Regulations

Definitions:

1. Women's Clothing Occupation:
   The above-named occupation includes the manufacture of coats, suits, skirts, dresses, waists and blouses.
2. Employees of ordinary ability: An experienced worker is one who has been employed in the industry for at least 36 weeks.
3. Employees: Women and minors employed in the Women's Clothing Occupation.
4. Minors: Employees of either sex under 21 years of age.

Women's Clothing Wage Board

List of Members

Representative of the Public

Harry Bergson, Esquire, *Chairman*, 31 State Street, Boston

Representatives of Employers:

Mr. Seymour Rivitz
Rivitz Bros.
15 Kneeland Street
Boston

Mr. Bernard Rosenberg
Boston Cloak Manufacturers' Assn.
Mass. Dress Manufacturers' Assn.
260 Tremont Street
Boston

Mr. Leopold Stern
Stern-Made Dress Company
786 Washington Street
Boston

Representatives of Employees:

Miss Mary J. Kearns
Marilyn Dress Company
786 Washington Street
Boston

Miss Jane Mara
Miller & Cutler
35 Kneeland Street
Boston

Mr. Philip Kramer
International Ladies' Garment Workers
25 LaGrange Street
Boston

Tables 1, 2, and 3 include inspection figures for the period Dec. 1, 1935, through Nov. 30, 1936

Table 1.—Disposition of Cases of Non-compliance Pending from Previous Years

(C = Cases; E = Establishments)

Disposition of Cases	Boot and Shoe Cut Stock and Findings		Bread and Bakery Products		Candy		Canning and Preserving and Minor Lines of Confectionery		Druggists' Compounds and Proprietary Medicines		Electrical Equipment and Supplies		Jewelry and Related Lines		Knit Goods		Laundry and Dry Cleaning		Men's Clothing and Raincoat	
	C.	E.	C.	E.	C.	E.	C.	E.	C.	E.	C.	E.	C.	E.	C.	E.	C.	E.	C.	E.
Cases of non-compliance	455	85	138	13	3	3	6	2	14	3	1,103	33	583	21	147	8	200	18	195	29
ADJUSTMENTS																				
Wages raised	–	–	17	4	–	–	1	1	–	–	–	–	77	8	19	2	12	1	26	4
Change of work, hours or method of payment	–	–	5	1	–	–	–	–	–	–	–	–	7	2	–	–	3	1	–	–
Adjustment promised	–	–	34	2	–	–	1	1	–	–	–	–	4	1	–	–	6	1	27	4
Covered by piece rate ruling	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Special license type	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Incorrectly recorded	–	–	–	–	–	–	–	–	–	–	–	–	3	1	–	–	–	–	–	–
Firm out of business	3	1	3	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	15	2
Technical non-compliance	–	–	–	–	–	–	–	–	–	–	–	–	4	1	–	–	–	–	–	–
Left, discharged or laid off	2	2	1	1	–	–	3	1	3	1	–	–	362	14	18	3	4	1	6	3
Absorbed by inspection under D. O. No. 2	–	–	–	–	–	–	–	–	–	–	1,103	33	–	–	–	–	–	–	–	–
PENDING	450	83	78	4	3	3	1	1	11	3	–	–	126	10	110	7	175	15	121	10

Table 1.—Disposition of Cases of Non-compliance Pending from Previous Years—Concluded

(C = Cases; E = Establishments)

Disposition of Cases	Men's Furnishings		Muslin Underwear		Office and Other Building Cleaners		Paper Box		Pocketbook and Leather Goods		Retail Store		Stationery Goods and Envelopes		Toys, Games and Sporting Goods		Women's Clothing		Total	
	C.	E.	C.	E.	C.	E.	C.	E.	C.	E.	C.	E.	C.	E.	C.	E.	C.	E.	C.	E.
Cases of non-compliance	846	39	1,453	65	29	13	18	9	12	5	3,949	579	149	8	312	24	7	3	9,619	960
ADJUSTMENTS																				
Wages raised	49	7	381	19	–	–	1	1	3	1	1	1	79	5	2	2	–	–	668	56
Change of work, hours or method of payment	139	9	64	9	–	–	–	–	–	–	–	–	7	1	39	4	–	–	264	27
Adjustment promised	63	4	–	–	1	1	–	–	–	–	–	–	–	–	–	–	–	–	136	14
Covered by piece rate ruling	20	2	5	1	–	–	–	–	–	–	–	–	–	–	3	1	–	–	28	4
Special license type	1	1	1	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	2
Incorrectly recorded	–	–	–	–	1	1	–	–	–	–	–	–	–	–	67	2	–	–	71	4
Firm out of business	6	2	17	2	–	–	–	–	2	1	–	–	–	–	4	1	–	–	50	10
Technical non-compliance	3	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	7	2
Left, discharged or laid off	245	16	391	21	27	11	4	3	3	1	22	2	30	4	82	9	1	1	1,204	94
Absorbed by inspection under D. O. No. 2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1,103	33
PENDING	320	19	594	46	–	–	13	6	4	2	3,926	579	33	4	115	11	6	2	6,086	805

Table 2.—Disposition of New Cases in Firms where Cases were Pending from Previous Years

(C = Cases; E = Establishments)

Situation and Disposition of Cases	Boot and Shoe Cut Stock and Findings		Bread and Bakery Products		Jewelry and Related Lines		Knit Goods		Men's Furnishings		Muslin Underwear	
	C.	E.	C.	E.	C.	E.	C.	E.	C.	E.	C.	E.
Number of cases of non-compliance	8	1	10	1	174	8	17	1	138	10	536	18
ADJUSTMENTS												
Wages raised	–	–	–	–	–	–	–	–	–	–	–	–
Left, laid off, or discharged	–	–	–	–	4	2	–	–	5	2	–	–
Change of work, hours or method of payment	–	–	–	–	–	–	–	–	8	1	–	–
Adjustment promised or reported	–	–	–	–	–	–	–	–	2	1	2	1
Special license type or similar case	–	–	–	–	–	–	–	–	7	1	–	–
PENDING	8	1	10	1	170	8	17	1	116	9	534	18

Situation and Disposition of Cases	Paper Box		Stationery Goods and Envelopes		Toys, Games, and Sporting Goods		Retail Stores		Total	
	C.	E.	C.	E.	C.	E.	C.	E.	C.	E.
Number of cases of non-compliance	1	1	92	3	121	6	11	1	1,108	50
ADJUSTMENTS										
Wages raised	–	–	–	–	14	1	–	–	14	1
Left, laid off, or discharged	–	–	–	–	71	1	–	–	80	5
Change of work, hours or method of payment	–	–	–	–	–	–	–	–	8	1
Adjustment promised or reported	–	–	–	–	–	–	–	–	4	2
Special license type or similar case	–	–	–	–	–	–	–	–	7	1
PENDING	1	1	92	3	36	6	11	1	995	49

Table 3.—Summary of Adjustments in Connection with Inspections in 1936 under Minimum Wage Decrees

(C = Cases; E = Establishments)

Situation and Disposition of Cases	Bread and Bakery Products		Candy [1]		Canning and Preserving and Minor Lines of Confectionery		Corset		Druggists' Compounds and Proprietary Medicines		Electrical Equipment and Supplies		Jewelry and Related Lines		Knit Goods		Laundry and Dry Cleaning		Men's Clothing and Raincoat [1]	
	C.	E.	C.	E.	C.	E.	C.	E.	C.	E.	C.	E.	C.	E.	C.	E.	C.	E.	C.	E.
Records for tabulation and establishments represented	1,423	43	163	9	1,047	64	595	16	609	45	6,682	38	1,412	31	772	19	6,893	492	657	9
Cases of non-compliance	14	4	13	2	81	11	60	4	5	4	1,502	22	114	22	166	7	1,068	49	32	4
ADJUSTMENTS																				
Wages raised	4	1	–	–	–	–	–	–	2	2	10	2	–	–	–	–	152	27	–	–
Left, laid off, or discharged	–	–	–	–	–	–	–	–	1	1	31	4	4	1	–	–	52	25	–	–
Change of work, hours or method of payment	4	2	–	–	–	–	5	1	–	–	10	1	1	1	–	–	27	7	5	1
Adjustment promised or reported	6	1	13	2	5	3	2	2	1	1	211	4	56	16	6	2	280	71	1	1
Covered by piece rate ruling	–	–	–	–	–	–	4	1	–	–	–	–	–	–	7	1	–	–	11	1
Incorrectly recorded	–	–	–	–	62	7	–	–	–	–	–	–	–	–	–	–	2	2	11	1
Firm out of business	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	6	1	–	–
Special license type or similar case	–	–	–	–	–	–	–	–	–	–	–	–	–	–	5	1	1	1	–	–
PENDING	–	–	–	–	14	1	49	1	1	1	1,240	17	53	16	148	4	548	70	4	1

[1] Partial inspection, not completed.

Table 3.—Summary of Adjustments in Connection with Inspections in 1936 under Minimum Wage Decrees—Concluded

(C = Cases; E = Establishments)

Situation and Disposition of Cases	Men's Furnishings		Millinery		Muslin Underwear		Office and Other Building Cleaners		Paper Box		Pocketbook and Leather Goods		Stationery Goods and Envelopes		Toys, Games and Sporting Goods		Women's Clothing[1]		Total	
	C.	E.	C.	E.	C.	E.	C.	E.	C.	E.	C.	E.	C.	E.	C.	E.	C.	E.	C.	E.
Records for tabulation and establishments represented	2,852	56	1,324	37	5,158	72	1,899	336	2,971	155	2,833	55	4,077	75	667	16	210	6	42,244*	1,574*
Cases of non-compliance	189	19	10	3	311	24	16	7	74	16	115	12	96	11	21	5	47	2	3,934	228
ADJUSTMENTS																				
Wages raised	7	3	5	2	48	8	1	1	8	5	12	3	1	1	1	1	1	1	252	57
Left, laid off, or discharged	2	2	4	1	49	8	1	1	12	5	2	1	–	–	1	1	17	2	176	52
Change of work, hours or method of payment	2	1	–	–	18	3	–	–	–	–	–	–	2	1	–	–	1	1	75	19
Adjustment promised or reported	8	3	1	1	37	6	12	5	29	6	32	4	7	4	16	2	–	–	723	134
Covered by piece rate ruling	–	–	–	–	2	1	–	–	–	–	–	–	–	–	–	–	–	–	24	4
Incorrectly recorded	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	75	10
Firm out of business	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	6	1
Special license type or similar case	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	6	2
PENDING	170	15	–	–	157	12	2	1	25	7	69	6	86	6	3	1	28	1	2,597	160

* In addition to the above inspections, visits were made to 14 brush factories securing 257 records; 1 boot and shoe cut stock and findings establishment securing 6 records and to 58 retail stores securing 359 records. In all of the above cases full compliance was found. The figures for these inspections are not included in the total.

[1] Partial inspection, not completed.

REPORT OF THE DIVISION OF SANITARY ENGINEERING

ARTHUR D. WESTON, *Director and Chief Engineer*

Oversight and Care of Inland Waters

During the year 1936 the Division of Sanitary Engineering investigated 857 applications requiring the advice of the Department, of which 229 related to municipal water supplies, 266 to private water supplies called to the attention of the Department by local health authorities, 33 to water supplies at schools, 88 to water supplies at camps, 5 to ice supplies, 35 to waters used for bathing and at swimming pools, 37 to shellfish, 19 to pollution of streams, 75 to sewerage and sewage disposal and 70 to miscellaneous matters. The number of applications received during the year 1936 was the largest ever received by the Department and is 23.5% in excess of the number received during the year 1935 and 29.5% in excess of the number received during the year 1934. These applications have required in most cases field examinations by engineers and the collection of samples of water or sewage for chemical analysis by the Water and Sewage Laboratories and bacterial examination by the Lawrence Experiment Station. In addition some of the applications have required field examinations by the chemists.

WATER SUPPLIES

Examination of Public Water Supplies

Public water supplies were introduced during the year 1936 in water districts as follows:

Woodland Park Water District in Auburn
Cotuit Fire District in Barnstable
Bernardston Fire and Water District in Bernardston
South Chelmsford Water District in Chelmsford
Easton Center Water District in Easton
Maple Hillside Water District in Millbury
Ring's Island Water District in Salisbury

and town supplies were introduced in the towns of

Harwich
North Reading
Sudbury
West Newbury

The introduction of these water supplies increased the number of cities and towns now supplied with water from public supplies to 248. Included in this number are a number of small towns supplied only in part by water companies, industrial plants and by other towns.

The municipalities not provided with public water supplies are shown in the following table:

Alford	Chilmark	Hampden
Ashby	Clarksburg	Hancock
Becket	Conway	Harvard
Bellingham	Dana	Hawley
Berkley	Dennis	Heath
Berlin	Dighton	Holland
Bolton	Dover	Hubbardston
Boxborough	Eastham	Lakeville
Boxford	Enfield	Lanesborough
Boylston	Essex	Leverett
Brewster	Florida	Leyden
Brimfield	Freetown	Lunenburg
Buckland	Gay Head	Mashpee
Burlington	Goshen	Mendon
Carlisle	Gosnold	Middlefield
Carver	Granby	Millville
Charlemont	Greenwich	Montgomery
Charlton	Halifax	Mt. Washington
Chesterfield	Hamilton	New Ashford

New Braintree	Raynham	Tolland
Newbury	Rehoboth	Topsfield
New Marlborough	Richmond	Truro
New Salem	Rochester	Tyngsborough
Norfolk	Rowe	Tyringham
Norwell	Rowley	Upton
Oakham	Royalston	Wales
Orleans	Sandisfield	Warwick
Otis	Sandwich	Washington
Pelham	Savoy	Wellfleet
Peru	Seekonk	Wendell
Petersham	Sherborn	Wenham
Phillipston	Shutesbury	Westport
Plainfield	Stow	W. Tisbury
Plympton	Swansea	Whately
Prescott	Templeton	Windsor
Princeton	Tewksbury	

The following tables summarize the major additions and improvements made in connection with public water supplies in the State during the year 1936:

Improvements and Extensions:	
Attleboro	Gravel-packed wells at South Attleboro (completed).
Dedham (Dedham Water Co.)	Large tubular wells (completed.
Dracut	New tubular wells (under construction).
Needham	Gravel-packed well (completed).
Tisbury	Infiltration gallery (completed).
Woburn	Gravel-packed wells (under construction).
Treatment Works Completed or Underway:	
Athol	Rapid sand filters (under construction).
Leominster	Rapid sand filters (completed).
Northborough	Modified slow sand filters (completed).
Norwood	Iron removal plant (under construction).
Randolph and Holbrook	Rapid sand filters (completed).
Russell	Slow sand filters (under construction).
Chemical Treatment for Corrosiveness:	
Barnstable (Barnstable Water Company).	
Winchester.	
Chlorinators Installed:	
Dedham (Dedham Water Company)	
Lowell	
Waltham	

During the year 1936 this Division was able to resume examinations of some of the watersheds of the public water supplies, funds for this work having been made available by the United States Public Health Service. Four additional engineers were engaged on this work.

During the latter part of the year three additional engineering districts were organized in the State, which, with the district already established for the Connecticut Valley and that part of the State west of that valley, provide a sanitary engineering district program for the entire State. The creation of these three additional districts appeared to be advisable in view of the very successful operations in the Springfield district so far as supervision of matters of water supplies, sewerage and sewage disposal, river pollution, etc., are concerned.

The following tables show the average results of chemical analyses of samples of water collected from the various sources of public water supply for the year 1936:

Analyses of the Water of Public Water Supplies

Averages of Chemical Analyses of Surface-Water Sources for the Year 1936

(Parts per Million)

City or Town	Source	Color	Residue on Evaporation	Ammonia		Chlorides	Hardness	Iron	Number of Samples Collected
				Free	Albuminoid				
Metropolitan Water District	Wachusett Reservoir, upper end	25	37	.019	.109	2.6	16	.10	23
	Wachusett Reservoir, lower end	13	35	.012	.092	2.5	14	.07	23
	Sudbury Reservoir	16	40	.010	.133	3.0	17	.10	12
	Framingham Reservoir No. 3	17	39	.016	.114	3.3	17	.14	9
	Ware River at Coldbrook intake	50	*43	.011	.155	1.8	13	.32	10
	Hopkinton Reservoir	45	35	.014	.144	2.9	13	.20	9
	Ashland Reservoir	40	41	.014	.131	3.5	13	.21	9
	Framingham Reservoir No. 2	59	65	.034	.177	9.0	19	.44	9
	Lake Cochituate	18	74	.126	.145	7.8	30	.13	9
	Chestnut Hill Reservoir	14	44	.010	.105	4.1	20	.16	12
	Weston Reservoir	16	35	.012	.106	3.1	17	.09	12
	Spot Pond	11	38	.008	.118	3.7	17	.10	12
	Tap in State House	14	38	.009	.099	3.9	18	.12	12
	Tap in Revere	10	37	.006	.080	3.9	17	.18	12
	Tap in Quincy	11	38	.003	.059	3.9	20	.12	12
Abington	Big Sandy Pond after treatment	6	36	.317	.111	8.5	8	.10	11
Acushnet (Fire and Water District)	New Bedford Water Supply								
Adams (Fire District)	Bassett Brook Reservoir	1	47	.004	.024	1.4	33	.05	3
Agawam	Springfield Water Supply								
Amherst (Water Co.)	Atkins Pond	20	30	.083	.193	1.5	10	.37	11
	Amethyst Brook-Intake Reservoir	25	35	.005	.103	1.9	11	.12	4
Andover	Haggett's Pond	14	47	.010	.146	5.1	21	.06	4
Arlington	Metropolitan Water Supply								
Ashburnham	Upper Naukeag Lake	6	25	.007	.040	1.6	8	.18	4
Ashfield (Water Co.)	Highland Spring Reservoir	21	55	.011	.094	1.3	33	.15	3
Athol	Buckman Brook Reservoir (Newton Reservoir)	19	33	.006	.120	1.3	10	.12	4
	Thousand Acre Meadow Brook	136	58	.026	.271	2.3	15	.16	4
	Inlet, Summer Street filters	22	36	.014	.112	1.5	11	.14	4
	Outlet, Summer Street filters	14	32	.001	.068	1.5	9	.07	4
	Phillipston Reservoir	38	39	.017	.244	3.0	11	.20	4
	Outlet of Mechanical Filter	28	43	.014	.223	3.3	12	.26	4
Barre	Reservoir	10	39	.014	.077	2.0	14	.23	3
Belmont	Metropolitan Water Supply								
Beverly	Joint supply with Salem								
Blandford (Fire District)	Freeland Brook	5	38	.000	.019	2.0	18	.09	3
Boston	Metropolitan Water Supply								
Braintree	Great Pond (raw water)	40	61	.025	.157	8.0	20	.19	6
	Great Pond, filtered	5	70	.032	.072	8.3	29	.05	6
Brockton	Silver Lake	6	34	.009	.094	6.5	9	.07	12
Brookfield	Cooley Hill Reservoir	11	34	.035	.143	1.9	10	.15	4
Cambridge	Upper Hobbs Brook Reservoir	30	64	.029	.224	5.1	27	.14	12
	Lower Hobbs Brook Reservoir	14	56	.036	.186	5.3	25	.09	12
	Stony Brook Reservoir	32	69	.039	.176	6.5	29	.16	12
	Fresh Pond	9	82	.038	.139	7.5	39	.10	11
	Filter effluent	3	85	.042	.058	6.9	43	.09	11
Chelsea	Metropolitan Water Supply								
Cheshire (Water Co.)	Kitchen Brook Reservoir	2	53	.000	.013	1.4	40	.08	3
Chester	Austin Brook Reservoir	7	38	.003	.074	1.5	21	.16	3
	Horn Pond	13	36	.020	.178	1.3	20	.14	3
Chicopee	Cooley Brook Reservoir, raw water	39	50	.025	.118	2.0	20	.22	10
	Cooley Brook Reservoir, filtered	1	62	.022	.021	2.7	28	.08	10
	Morton Brook	7	61	.010	.025	3.6	21	.41	10
Clinton	Lower Lynde's Reservoir	29	42	.172	.364	2.1	–	.11	4
	Heywood Pond	9	27	.015	.155	1.7	11	.11	4
	Spring Basin	8	60	.016	.038	3.1	26	.08	3
Colrain (Griswoldville)	McClellan Brook Reservoir	0	66	.000	.004	1.6	43	.05	1
Colrain (Fire District No. 1)	Mountain Brook Reservoir	1	90	.008	.035	1.3	67	.08	2
Concord	Nagog Pond	6	32	.011	.124	4.1	12	.07	4
Dalton	Egypt Brook Reservoir	21	36	.014	.071	1.1	17	.25	3
	Cady Brook	16	59	.010	.098	1.2	36	.10	1
	Tap in town	19	50	.005	.079	1.3	29	.17	3
	Windsor Reservoir	18	56	.033	.218	1.1	33	.30	2
Danvers	Middleton Pond	46	43	.023	.217	3.8	17	.15	6
	Swan Pond	28	45	.011	.176	3.8	18	.11	5

* Unfiltered.

Averages of Chemical Analyses of Surface-Water Sources, etc.—Continued

(Parts per Million)

City or Town	Source	Color	Residue on Evaporation	Ammonia		Chlorides	Hardness	Iron	Number of Samples Collected
				Free	Albuminoid				
Dartmouth	New Bedford Water Supply								
Deerfield (South Deerfield Water Supply District)	Roaring Brook Reservoir	9	58	.000	.033	1.3	34	.07	4
East Bridgewater	Brockton Water Supply								
East Longmeadow	Springfield Water Supply								
Egremont (South Egremont Water Co.)	Goodale Brook Reservoir	4	43	.004	.018	1.1	34	.12	2
Erving (Millers Falls Fire and Water District)	Montague (Turners Falls Fire District) Water Supply								
Everett	Metropolitan Water Supply								
Fall River	North Watuppa Lake	8	38	.015	.107	5.8	11	.11	11
Falmouth	Long Pond, before lime treatment	3	33	.006	.073	10.3	8	.07	6
	Long Pond, treated	5	45	.006	.066	10.2	23	.08	6
Fitchburg	Ashby Reservoir	20	26	.064	.116	1.8	8	.36	10
	Scott Reservoir	11	27	.056	.109	1.9	6	.37	4
	Meetinghouse Pond	7	29	.021	.105	1.9	10	.07	4
	Wachusett Lake	7	25	.018	.111	1.9	6	.21	4
	Falulah Brook	17	24	.004	.095	1.6	6	.21	4
	Lovell Reservoir	17	30	.026	.100	1.7	5	.32	4
Framingham	Tap in Pumping Station	13	62	.071	.090	8.0	28	.17	10
Gardner	Crystal Lake	16	50	.040	.140	3.9	23	.35	4
Gloucester	Haskell Reservoir	10	40	.003	.102	9.0	10	.19	4
	Dike's Brook Reservoir	33	43	.042	.136	9.5	8	.65	4
	Wallace Reservoir	22	42	.006	.143	10.3	10	.34	4
	Babson Reservoir	61	68	.060	.140	13.0	14	.92	4
Great Barrington (Housatonic Water Works Co.)	Long Pond	6	79	.004	.163	1.4	73	.06	5
Great Barrington (Fire District)	East Mountain Reservoir	4	46	.008	.097	1.3	33	.12	4
Greenfield	Filter plant (raw water) (Glen Brook and Green River well)	5	54	.021	.052	1.6	35	.13	12
	Filter plant (outlet of filters)	1	58	.003	.016	1.6	39	.10	12
Groveland	Haverhill Water Supply								
Hadley (Water Supply District)	Hart's Brook Reservoir	7	44	.011	.037	1.8	20	.08	3
Hanson	Brockton Water Supply								
Hatfield	Running Gutter Brook Reservoir	10	66	.000	.039	1.6	29	.08	3
Haverhill	Millvale Reservoir	50	53	.021	.151	4.1	21	.23	11
	Johnson's Pond	17	52	.017	.150	5.0	27	.20	11
	Crystal Lake	13	41	.010	.114	4.0	14	.08	11
	Pentucket Lake	6	44	.015	.150	4.2	22	.07	11
	Kenoza Lake	18	48	.022	.130	4.8	23	.23	11
Hingham (Water Co.)	Accord Pond	25	39	.019	.119	6.9	9	.30	10
Hinsdale (Fire District)	Reservoir	5	20	.004	.039	1.3	8	.25	3
Holbrook	Joint Supply with Randolph								
Holden	Rutland Water Supply								
Holyoke	Hugh McLean Reservoir	8	33	.014	.135	1.4	18	.10	11
	Carmody Reservoir	21	37	.019	.158	1.7	14	.15	11
	Wright and Ashley ponds	7	50	.012	.123	1.5	28	.09	11
	White Reservoir	21	32	.018	.173	1.5	16	.26	11
	Whiting Street Reservoir	8	48	.027	.184	1.8	26	.10	11
Hopedale	Milford Water Supply								
Hudson	Gates Pond	11	32	.030	.118	2.5	13	.14	6
Hull	Hingham Water Supply								
Huntington (Fire District)	Cold Brook Reservoir	11	44	.001	.029	1.8	16	.12	6
Ipswich	Dow's Brook Reservoir	25	54	.020	.132	7.5	23	.12	4
	Bull Brook Reservoir	87	84	.025	.237	7.6	28	.22	4
Lancaster	Clinton Water Supply								
Lawrence	Merrimack River	33	61	.190	.240	4.0	13	.46	11
	Merrimack River, filtered	34	59	.070	.126	6.5	14	.75	12
Lee (Berkshire Water Co.)	Codding Brook Upper Reservoir	7	62	.004	.036	1.3	49	.07	4
	Codding Brook Lower Reservoir	4	65	.000	.027	1.3	50	.10	4
Lenox (Water Co.)	Basin Pond Brook	28	38	.004	.096	1.1	23	.08	4
	Lower Root Reservoir	6	72	.018	.069	1.2	60	.08	4
	Woolsey Reservoir	3	56	.014	.033	1.2	37	.05	4

Averages of Chemical Analyses of Surface-Water Sources, etc.—Continued

(Parts per Million)

City or Town	Source	Color	Residue on Evaporation	Ammonia		Chlorides	Hardness	Iron	Number of Samples Collected
				Free	Albuminoid				
Leominster	Fall Brook Reservoir	18	24	.021	.095	2.0	5	.28	5
	Haynes Reservoir	18	23	.060	.230	1.8	4	.21	5
	Morse Reservoir	14	22	.034	.097	1.8	6	.10	5
	No-Town Reservoir	26	23	.019	.135	2.1	5	.19	5
Lexington	Metropolitan Water Supply								
Lincoln	Sandy Pond	5	30	.013	.086	3.3	12	.08	3
Longmeadow	Springfield Water Supply								
Ludlow	Springfield Water Supply								
Lynn	Breeds Pond	20	58	.037	.176	7.2	26	.18	10
	Birch Pond	6	49	.019	.157	7.3	20	.11	10
	Hawkes Pond	54	76	.048	.271	7.9	36	.25	10
	Walden Pond	38	68	.042	.202	7.8	28	.26	10
Lynnfield (Water District)	Lynn Water Supply								
Malden	Metropolitan Water Supply								
Manchester	Gravel Pond	10	43	.005	.099	8.6	12	.18	12
Marlborough	Lake Williams	9	55	.046	.153	6.4	26	.11	4
	Millham Brook Reservoir	40	49	.059	.158	4.0	19	.33	4
Maynard	White Pond	4	28	.007	.104	2.7	10	.08	5
Medford	Metropolitan Water Supply								
Melrose	Metropolitan Water Supply								
Middleton	Joint supply with Danvers								
Milford (Water Co.)	Charles River, inlet to filters	42	46	.035	.165	3.0	17	.17	4
	Dug wells and Charles River, filtered	21	62	.006	.046	3.5	31	.10	4
Milton	Metropolitan Water Supply								
Monroe (Water District)	Phelps Brook Reservoir	8	29	.010	.020	1.3	12	.09	2
Montague (Turners' Falls Fire District)	Lake Pleasant	8	30	.024	.061	1.6	11	.16	4
Monterey (Water Co.)	Reservoir	8	90	.000	.026	1.5	84	.13	4
Nahant	Metropolitan Water Supply								
New Bedford	Great Quittacas Pond	39	42	.025	.172	5.9	11	.12	10
	Little Quittacas Pond	25	38	.026	.162	5.7	10	.18	20
Newburyport	Artichoke River	28	*60	.060	.327	5.6	22	.32	7
	Collecting Basin	8	*65	.006	.083	6.4	26	.28	7
	Mixed raw water	14	*64	.037	.206	6.1	26	.44	7
	Ground and Reservoir water, filtered	7	59	.001	.056	6.3	29	.07	7
North Adams	Broad Brook	11	39	.004	.039	1.1	22	.06	5
	Notch Brook Reservoir	7	74	.009	.043	1.0	65	.11	5
	Mount Williams Reservoir	6	60	.006	.075	1.1	42	.40	5
Northampton	Middle Reservoir (Roberts Meadow Brook)	20	43	.004	.086	1.6	21	.26	5
	Mountain Street Reservoir	9	36	.006	.064	1.3	21	.10	5
North Andover	Great Pond	15	41	.024	.130	4.6	20	.22	4
Northborough	Reservoir (Cold Harbor Brook)	42	44	.032	.137	2.6	17	.22	6
	Reservoir, filtered	6	63	.001	.058	3.2	25	.11	4
North Brookfield	Doane Pond	25	29	.175	.241	2.1	11	.47	6
	North Pond	28	32	.254	.265	2.2	11	.38	5
Northfield (Water Co.)	Minot Brook Reservoir	8	38	.001	.021	1.3	15	.05	3
Northfield (Northfield Schools, Inc.)	Upper Reservoir on Louisiana Brook	28	40	.074	.119	1.4	20	.80	4
	Lower Reservoir on Louisiana Brook	29	40	.069	.112	1.5	19	.74	4
Norwood	Buckmaster Pond, filtered	6	53	.011	.051	5.7	24	.18	10
Orange	Coolidge Brook Reservoir	32	39	.039	.095	1.9	11	.10	3
Palmer (Fire District No. 1)	Graves Brook, Lower Reservoir	12	35	.013	.049	1.7	13	.37	6
Peabody	Spring Pond	11	56	.049	.143	7.5	23	.12	6
	Suntaug Lake	27	62	.077	.200	8.0	23	.10	6
Pembroke	Brockton Water Supply								
Pittsfield	Sackett Reservoir	12	142	.010	.052	1.3	151	.08	4
	Hathaway Reservoir	6	147	.002	.036	1.6	160	.07	4
	Ashley Reservoir	12	38	.067	.121	1.6	24	.13	4
	Ashley Lake	9	47	.028	.149	1.7	29	.14	4
	Farnham Reservoir	34	43	.042	.196	1.4	18	.16	4
	Mill Brook Reservoir	30	45	.031	.144	1.4	21	.15	4
Plainville	North Attleborough Water Supply								
Plymouth	Little South Pond	5	27	.020	.128	7.6	5	.05	4
	Great South Pond	2	23	.017	.092	7.2	5	.05	4
Quincy	Metropolitan Water Supply								
Randolph	Great Pond	30	64	.025	.145	8.8	22	.17	6
Revere	Metropolitan Water Supply								
Rockland	Joint supply with Abington								

* Unfiltered.

Averages of Chemical Analyses of Surface-Water Sources, etc.—Concluded

(Parts per Million)

City or Town	Source	Color	Residue on Evaporation	Ammonia		Chlorides	Hardness	Iron	Number of Samples Collected
				Free	Albuminoid				
Rockport	Cape Pond	38	83	.054	.208	23.7	18	1.46	8
Russell	Black Brook Reservoir	9	32	.001	.035	2.0	14	.14	4
Rutland	Muschopauge Lake	7	31	.036	.174	3.5	12	.06	4
Salem	Ipswich River at pumping station	*76	138	.140	.272	9.9	62	.49	6
	Longham Reservoir	75	73	.077	.247	10.5	25	.87	10
	Wenham Lake	30	74	.057	.149	9.7	30	.38	10
	Wenham Lake, filtered	5	85	.176	.064	9.8	40	.07	10
Saugus	Lynn Water Supply								
Shelburne (Shelburne Falls Fire District)	Fox Brook Reservoir	1	62	.003	.031	1.3	39	.10	3
Somerville	Metropolitan Water Supply								
Southborough	Sudbury Reservoir	14	36	.014	.105	3.2	14	.11	10
Southbridge	Hatchet Brook Reservoir No. 3	22	26	.017	.100	1.9	9	.25	6
	Hatchet Brook Reservoir No. 4	20	28	.026	.106	1.9	10	.23	5
South Hadley (South Hadley Falls Fire District No. 1)	Buttery Brook Reservoir	11	53	.063	.114	3.7	20	.55	6
	Leaping Well Reservoir	6	33	.006	.105	1.8	10	.15	6
Southwick	Springfield Water Supply								
Spencer	Shaw Pond	9	23	.016	.117	1.8	9	.17	7
Springfield	Cobble Mountain Reservoir	19	33	.013	.113	1.4	11	.28	10
	Cobble Mountain Reservoir, filtered	11	35	.002	.045	1.4	12	.11	10
Stockbridge (Water Co.)	Lake Averic	8	62	.010	.126	1.4	45	.09	5
Stoneham	Metropolitan Water Supply								
Stoughton	Muddy Pond	14	44	.007	.073	3.8	11	.07	3
Sunderland (Water Co.)	Saw Mill Brook Reservoir	3	69	.001	.012	1.7	45	.06	4
Swampscott	Metropolitan Water Supply								
Taunton	Assawompsett Pond	27	35	.045	.154	5.5	9	.15	9
	Elder's Pond	9	31	.021	.118	5.4	9	.07	9
Wakefield	Crystal Lake	17	73	.072	.210	8.8	32	.45	12
	Crystal Lake, filtered	6	71	.003	.083	8.5	33	.06	12
Wareham (Onset Fire District)	Jonathan Pond	1	29	.003	.088	5.6	5	.05	6
Watertown	Metropolitan Water Supply								
West Bridgewater	Brockton Water Supply								
Westfield	Montgomery Reservoir	30	30	.024	.129	1.6	5	.12	4
	Winchell Reservoir	12	28	.019	.067	1.4	6	.09	4
	Granville Reservoir	14	28	.024	.081	1.5	7	.32	11
Westhampton (Water Co.)	Reservoir	9	44	.001	.039	1.4	22	.16	3
West Springfield	Bear Hole Brook Reservoir	8	76	.030	.065	1.5	47	.16	4
	Bear Hole Brook Reservoir, filtered	4	70	.002	.026	1.6	48	.05	4
West Stockbridge (East Mountain Water Co.)	East Mountain Reservoir	0	68	.001	.022	1.5	40	.07	2
Weymouth	Great Pond	38	45	.020	.115	5.9	12	.26	5
	Great Pond, filtered	2	60	.010	.055	6.0	16	.08	5
Whitman	Brockton Water Supply								
Wilbraham	Springfield Water Supply								
Williamsburg	Unquomonk Brook Reservoir	10	57	.002	.073	1.5	27	.22	3
Williamstown (Water Co.)	Paul Brook	4	57	.006	.051	1.1	43	.07	3
	Cold Spring	0	135	.000	.007	1.1	137	.05	3
	Sherman Spring	2	104	.000	.009	1.1	85	.05	3
	Rattlesnake Brook Reservoir	5	80	.003	.025	1.1	75	.05	3
Winchester	North Reservoir	6	42	.022	.118	4.6	20	.10	5
	Middle Reservoir	10	34	.032	.172	4.0	15	.20	5
	South Reservoir	8	38	.014	.093	4.1	17	.12	5
Winthrop	Metropolitan Water Supply								
Worcester	Pine Hill Reservoir	15	35	.075	.141	2.6	14	.49	7
	Upper Holden Reservoir	13	26	.010	.099	2.0	10	.11	6
	Lower Holden Reservoir	10	28	.011	.086	2.0	10	.12	6
	Leicester Reservoir (Lynde Reservoir)	13	34	.028	.117	2.1	14	.09	6
	Bottomly Reservoir (Kettle Brook No. 4)	27	39	.016	.181	2.1	17	.13	4
	Kent Reservoir (Kettle Brook No. 1)	15	32	.036	.123	2.0	14	.11	4
	Mann Reservoir (Kettle Brook No. 2)	16	36	.018	.137	1.9	15	.09	4
	Kendall Reservoir	8	26	.017	.117	2.0	9	.10	4
	Quinapoxet Pond	23	33	.018	.118	1.9	12	.11	7

* Unfiltered.

Averages of Chemical Analyses of Ground-Water Sources for the Year 1936

(Parts per Million)

City or Town	Source	Color	Residue on Evaporation	Ammonia		Chlorides	Nitrogen as		Hardness	Iron	Number of Samples Collected
				Free	Albuminoid		Nitrates	Nitrites			
Acton (West and South Water Supply District)	Tubular wells	0	99	.001	.014	6.0	1.5	.000	44	.06	5
Amesbury	Tubular wells	10	145	.094	.038	5.4	.07	.000	64	7.2	5
	Tubular wells, filtered	6	127	.000	.017	5.2	.08	.000	64	.17	5
Ashland	New tubular wells	0	57	.011	.017	4.4	.15	.000	27	.08	6
Attleboro	Dug wells and filtered water (South Attleboro)	5	53	.008	.055	5.4	.21	.000	26	.07	4
Auburn (Water Co.)	Tubular wells	0	115	.000	.007	9.3	2.1	.000	62	.05	3
Avon	Dug and tubular wells	1	77	.003	.016	6.6	2.9	.000	34	.05	5
Ayer	Dug well	1	86	.001	.008	8.8	1.8	.000	37	.08	9
	Tubular wells	2	73	.003	.008	4.6	.15	.001	39	.33	9
Barnstable (Water Co.)	Tubular wells (old supply)	1	51	.008	.008	11.5	.04	.000	20	.25	3
(Fire District)	Tap in town (supplied from Yarmouth)	0	43	.000	.010	13.4	.08	.000	11	.08	3
Bedford	Dug well	4	41	.001	.013	3.8	.12	.000	16	.06	4
	Tubular wells	2	46	.000	.009	4.2	.21	.000	17	.39	4
Belchertown (Water District)	Tubular wells	1	75	.001	.006	4.8	.82	.000	33	.09	4
Billerica	Gravel-packed wells — Tap in pumping station	20	87	.084	.076	9.4	.15	.000	32	.39	9
Bourne (Monument Beach)	Tubular wells	0	48	.000	.009	10.0	.50	.000	18	.08	3
(Pocasset Beach)	Tubular wells	0	62	.034	.014	19.4	.22	.006	17	.10	2
(Pocasset — North Shore)	Tubular wells	7	54	.003	.013	14.7	.40	.000	19	.15	2
(Sagamore — Ware Tenement Supply)	Tubular wells	0	63	.001	.004	10.5	2.7	.000	15	.07	3
(Sagamore — Keith Block)	Tubular wells	6	57	.000	.013	13.7	.47	.000	15	.33	3
(Sagamore — Knowlton Property	Tubular wells	0	40	.001	.005	9.3	.06	.000	6	.45	3
(Sagamore — Savery Supply)	Tubular wells	2	48	.000	.003	10.7	.20	.000	14	.18	3
(Sagamore Beach)	Tubular wells	0	62	.002	.007	18.4	.30	.000	13	.15	2
(Sagamore Heights)	Tubular wells	0	49	.001	.008	14.9	.25	.000	12	.16	2
Bridgewater	Tubular wells	2	65	.003	.005	6.4	1.9	.001	21	.14	4
Brookline	Tubular wells and filter gallery, raw water	40	107	.070	.070	9.1	.38	.003	49	2.5	9
	Tubular wells and filter gallery, filtered	9	98	.002	.054	9.3	.45	.000	45	.09	9
Canton	Henry's Spring well	3	71	.005	.015	7.0	.92	.001	28	.29	4
	Ward well	15	84	.006	.059	6.7	.84	.000	28	.10	4
	Springdale well	2	68	.007	.015	5.8	.80	.000	24	.14	4
Chatham (Water Co.)	Tubular wells	1	48	.004	.009	12.1	.10	.000	10	.05	3
	Filter gallery near White Pond	4	51	.005	.061	17.9	.08	.000	12	.06	3
Chelmsford (North Chelmsford Fire District)	Tubular wells	17	56	.151	.058	4.6	.46	.001	24	.47	5
Chelmsford (Water District)	Tubular wells	5	79	.004	.017	6.4	1.7	.006	36	.22	4
Cohasset (Water Co.)	Beechwood filter plant (raw water)	82	80	.072	.151	13.0	.17	.000	26	1.05	4
	Filtered water	8	67	.048	.057	13.5	.42	.000	37	.14	6

Averages of Chemical Analyses of Ground-Water Sources, etc.—Continued

(Parts per Million)

City or Town	Source	Color	Residue on Evaporation	Ammonia		Chlorides	Nitrogen as		Hardness	Iron	Number of Samples Collected
				Free	Albuminoid		Nitrates	Nitrites			
Colrain (Griswoldville)	Deep tubular well	9	77	.000	.008	1.8	.22	.000	47	.37	2
Colrain (Lyonsville)	Spring	19	71	.000	.007	0.9	.11	.000	46	1.27	2
	Deep tubular well	3	127	.001	.003	1.4	.06	.000	72	.07	2
Cummington	Springs	0	43	.002	.009	2.3	1.3	.001	25	.10	2
Dedham (Water Co.)	Dug and tubular wells	6	106	.020	.050	11.2	1.1	.000	47	.13	6
Deerfield (Fire District)	North Springs	0	55	.002	.013	2.3	.13	.000	29	.06	4
	South Springs	17	40	.001	.030	1.9	.16	.000	20	.10	4
Douglas	Tubular wells	1	56	.000	.007	3.9	.59	.000	22	.09	4
Dover	Tubular wells	0	101	.002	.003	9.2	1.0	.000	50	.06	2
Dracut (Water Supply District)	Tubular wells, Dracut	7	124	.010	.044	8.7	2.1	.000	61	.13	4
	Tubular wells, Collinsville	11	82	.004	.043	3.1	.31	.000	29	.30	4
Dudley	Tubular wells	1	37	.004	.017	2.5	.12	.001	15	.06	3
Dunstable	Tubular wells	0	53	.002	.007	3.3	1.18	.004	23	.13	3
Duxbury (Fire and Water District)	Tubular wells	0	51	.002	.009	9.2	.08	.000	14	.07	3
East Brookfield	Well	0	27	.001	.009	2.1	.08	.000	11	.04	3
Easthampton	Tubular wells	0	77	.001	.005	2.2	.38	.000	41	.06	3
Easton (North Easton Village District)	Dug well	3	45	.001	.033	5.6	.43	.000	23	.06	6
Easton (Unionville Fire and Water District)	North Easton Village District Water Supply										
Edgartown (Water Co.)	Dug and tubular wells	0	36	.000	.007	9.2	.05	.000	7	.07	3
Fairhaven (Water Co.)	Tubular wells near Nasketucket River	37	74	.002	.078	10.5	.65	.000	29	.15	6
	Tubular wells near Mattapoisett River	0	67	.001	.010	9.6	1.1	.000	26	.05	6
Foxborough	Tubular wells	2	57	.005	.012	4.5	.82	.001	23	.21	3
Framingham	North Filter Gallery	2	125	.144	.040	18.7	.16	.003	63	.18	5
	South Filter Gallery	2	124	.460	.050	20.3	.12	.000	64	.08	5
Franklin	Tubular wells	0	49	.007	.012	4.8	.18	.000	24	.32	3
Georgetown	Tubular wells (raw water)	3	66	.002	.005	4.4	.12	.000	27	1.55	12
	Tubular wells, filtered	3	63	.001	.006	4.3	.12	.000	27	.41	12
	Tap in town	2	69	.000	.005	4.7	.15	.000	29	.25	5
Gill (Riverside Water Co.)	Spring	0	70	.005	.018	2.5	1.05	.000	34	.04	2
Grafton (Water Co.)	Gravel-packed well at North Grafton	0	–	.001	.008	6.1	.65	.000	31	.25	2
	Dug wells at Grafton	6	123	.000	.022	11.5	3.8	.000	49	.20	4
Granville (Center Water Co.)	Well and springs	3	36	.002	.014	1.5	.11	.000	11	.08	3
Great Barrington (Fire District)	New infiltration gallery near Green River	0	99	.001	.034	1.5	.30	–	84	.06	4
Greenfield	Dug well near Green River	0	65	.000	.007	1.4	.07	–	45	.09	4
Groton (Water Co.)	Dug well	0	69	.037	.023	2.2	.11	.017	41	.07	3
Groton (West Groton Water Supply District)	Tubular wells	0	51	.000	.007	2.6	.48	.000	31	.05	6
Hanover	Tubular wells	2	63	.002	.018	7.2	.12	.000	26	.22	11
Hardwick (Center)	Dug well	4	49	.000	.013	1.9	.07	.000	28	.60	3
Hardwick (Gilbertville)	Dug and tubular wells	0	68	.000	.011	1.9	.07	.001	39	.06	3
Hardwick (Wheelwright)	Tubular wells	0	40	.002	.004	3.5	.80	.000	17	.08	3
Hingham (Water Co.)	Filter galleries	17	75	.007	.047	7.9	.31	.010	36	.20	10
Holliston (Water Co.)	Large well	36	54	.020	.133	4.6	.12	.000	22	.38	9

Averages of Chemical Analyses of Ground-Water Sources, etc.—Continued

(Parts per Million)

City or Town	Source	Color	Residue on Evaporation	Ammonia		Chlorides	Nitrogen as		Hardness	Iron	Number of Samples Collected
				Free	Albuminoid		Nitrates	Nitrites			
Hopedale	Milford Water Supply										
Hopkinton	Tubular wells	0	62	.000	.004	3.8	1.0	.000	26	.05	2
Hull	Hingham Water Supply										
Kingston	Tubular wells	3	45	.000	.006	7.2	.08	.000	12	.05	3
Leicester (Water Supply District)	Dug wells	8	78	.001	.035	3.2	1.3	.000	35	.12	3
Leicester (Cherry Valley and Rochdale Water District)	Dug wells	26	47	.045	.120	3.1	.13	.000	20	.15	3
Littleton	Tubular wells	0	38	.001	.006	2.6	.37	.000	22	.05	3
Lowell	Boulevard wells, raw water	44	60	.263	.048	4.2	.28	.002	25	3.3	11
	Effluent of sand filter	11	53	.003	.022	4.3	.36	.000	24	.29	11
Manchester	Dug and tubu-wells	2	108	.002	.015	15.8	1.1	.000	39	.28	12
Mansfield	Dug well	0	47	.000	.004	3.8	.28	.000	17	.08	6
Marblehead	Tubular wells	34	231	.060	.149	10.9	.21	.008	134	.20	11
	Dug well	5	182	.054	.024	19.5	.16	.001	96	1.4	6
	Dug and tubular wells, filtered	5	199	.001	.029	23.7	.37	.000	95	.17	6
Marion	Old tubular wells	1	49	.000	.010	7.7	.45	.000	19	.05	4
	New tubular wells	0	85	.000	.004	15.6	.60	.000	36	.10	2
Marshfield	Tubular wells	6	52	.000	.005	8.4	.11	.000	9	.07	5
Marshfield (Humarock Beach Supply)	Tubular wells	0	83	.000	.006	22.0	.35	.000	23	.15	2
Mattapoisett	Tubular wells	4	59	.003	.006	8.3	.33	.000	23	.17	3
Medfield	Tubular wells, tap in town (supplied from State Hospital)	0	72	.000	.007	4.6	.21	.000	36	.06	4
Medway	Tubular wells	5	88	.056	.016	11.0	.93	.001	37	.23	6
Merrimac	Tubular wells	2	72	.003	.006	6.0	.27	.000	35	.11	4
Methuen	Gravel-packed well No. 1 (Harris Brook)	19	85	.044	.036	7.3	.93	.000	38	.54	6
	Lone Tree Hill gravel-packed wells	8	99	.343	.048	7.5	.75	.005	48	.37	9
Middleborough	Dug well	16	71	.135	.049	7.6	.55	.001	33	3.2	5
	Dug well, filtered	19	56	.004	.020	7.5	.61	.008	30	.35	5
Millbury (Water Co.)	Dug well	3	46	.000	.013	3.6	.57	.000	23	.05	3
Millis	Dug wells	0	131	.000	.005	10.7	3.5	.000	62	.07	6
Monson	Old dug well	21	35	.001	.052	2.0	.12	.000	11	.08	4
	New dug well	0	28	.000	.016	1.8	.08	.000	8	.05	4
Montague (Montague Village)	Springs	6	47	.001	.017	1.7	.15	.000	27	.08	3
Nantucket (Wannacomet Water Co.)	Wells at Wyers Valley	0	59	.008	.007	18.0	.16	.000	19	.05	5
Nantucket (Siasconset)	Dug wells	0	65	.005	.020	16.9	.13	.000	23	.16	3
Natick	Dug well	0	115	.002	.009	11.3	.61	.000	58	.05	6
Needham	Dug well No. 1	1	87	.003	.009	7.8	3.0	.000	40	.07	6
	Dug well No. 2	1	85	.000	.014	7.1	2.2	.001	40	.06	6
	Tubular wells (Great Plain Avenue)	0	99	.014	.033	9.7	.92	.000	35	.10	6
Newton	Tap in pumping station (treated water)	4	124	.006	.025	9.2	.34	.000	31	.15	12
	Dug well No. 1	0	78	.001	.015	7.9	.32	.000	39	.06	12
	Dug well No. 2	1	73	.002	.023	8.1	.26	.000	35	.08	12
North Attleborough	Dug wells	4	57	.000	.029	5.2	.37	.000	28	.40	4
Northbridge	Tubular wells (Meadow Pond)	2	35	.000	.018	3.5	.11	.000	14	.11	4
	Tubular wells (Cook Allen)	5	30	.006	.032	2.5	.09	.000	9	.80	3
Norton	Tubular wells	3	50	.005	.005	3.4	.05	.000	21	.23	3

Averages of Chemical Analyses of Ground-Water Sources, etc.—Continued

(Parts per Million)

City or Town	Source	Color	Residue on Evaporation	Ammonia		Chlorides	Nitrogen as		Hardness	Iron	Number of Samples Collected
				Free	Albuminoid		Nitrates	Nitrites			
Norwood	Tubular wells	3	91	.009	.015	8.4	.95	.001	43	.25	11
Oak Bluffs (Cottage City Water Co.)	Springs	0	40	.002	.018	9.1	.17	.000	9	.11	3
Orange	Crystal Spring	8	37	.001	.020	2.1	.07	–	12	.10	3
Oxford (Water Co.)	Tubular wells	0	47	.007	.007	3.7	.45	.000	23	.04	3
Palmer (Bondsville Water Co.)	Tubular wells	2	65	.001	.014	3.4	.37	.000	27	.16	3
(Thorndike)	Hamilton Reservoir	8	40	.002	.038	2.0	.04	–	17	.10	4
(Three Rivers)	Collecting well	0	41	.005	.015	2.5	.25	.000	15	.07	2
	Tubular wells	3	56	.001	.020	4.0	.60	.000	29	.75	2
Paxton	Spring	1	29	.001	.012	1.7	.06	.000	13	.09	12
Pepperell	Tubular wells	0	34	.002	.010	2.3	.12	.000	14	.05	3
Provincetown	Tubular wells	1	196	.004	.003	78.0	.02	.000	45	.06	6
Reading	New tubular wells	2	89	.001	.013	5.8	.25	.000	42	.36	5
Rockport	Tubular wells	trace	66	.000	.009	16.4	.24	.000	24	.06	2
Salisbury (Water Supply Co.)	Old dug well	10	94	.015	.023	6.4	.09	.000	39	.24	4
	New dug well	6	96	.005	.014	7.2	.06	.000	63	1.03	6
Scituate	Webster Meadow wells	0	140	.000	.006	27.8	1.15	.000	61	.10	10
	Beaver Dam wells	1	149	.000	.035	25.6	1.9	.000	52	.12	2
	Kent Street wells	1	420	.000	.006	74.1	.75	.000	128	.18	3
Sharon	Dug well	0	193	.002	.004	35.9	5.0	.001	92	.05	4
	Tubular wells	0	61	.000	.005	6.6	1.0	.000	27	.10	4
Sheffield (Water Co.)	Smith Spring	0	32	.000	.012	1.1	.08	.000	20	.04	3
	Farm House Spring	0	39	.001	.023	1.2	.10	.000	22	.05	3
	Red Rock Spring	0	35	.000	.005	1.1	.15	.000	20	.06	3
Shirley (Shirley Village Water District)	Dug wells	1	65	.002	.004	6.6	3.2	.000	25	.10	3
Shrewsbury	Gravel-packed wells (South Street)	1	54	.000	.015	3.6	.77	.000	24	.07	3
	Gravel-packed wells (Oak Street)	0	57	.000	.010	4.5	.27	.000	25	.08	3
Somerset	Tubular wells	20	124	.002	.028	6.6	.22	.000	32	.52	6
South Hadley (Fire District No. 2)	Dug wells	0	59	.001	.023	2.0	.33	.000	30	.05	3
	Elmer Brook	5	70	.008	.058	1.7	.05	–	37	.10	3
	Elmer Brook filtered	1	72	.001	.023	1.9	.11	.000	38	.05	3
Stockbridge (Hill Water Co.)	Springs	1	67	.000	.009	1.5	.06	–	51	.08	3
Sturbridge	Tubular wells	3	60	.006	.008	4.5	.15	.000	24	.78	9
Sutton (Water Co.)	Dug and tubular wells	0	125	.049	.011	5.9	4.5	.001	60	.26	3
Tisbury	Tashmoo Spring	0	44	.002	.006	10.9	.08	.000	9	.06	7
Townsend	Tubular wells	0	30	.001	.010	2.3	.13	.000	10	.07	10
Upton (West Upton)	Tubular wells	4	94	.000	.004	6.6	1.7	.000	41	.05	4
Uxbridge	Tubular wells (new system)	0	68	.001	.007	6.0	1.4	.000	27	.15	3
Walpole	Tubular wells	0	60	.001	.021	5.1	.57	.000	24	.04	3
Waltham	Old dug well	9	101	.060	.029	10.2	.19	.000	46	1.0	11
	New dug well	0	72	.010	.024	6.7	.40	.000	37	.08	11
Ware	Large well, treated	0	108	.001	.006	5.5	1.5	.000	32	.05	8
Wareham (Wareham Fire District)	Tubular wells	1	34	.001	.005	6.6	.04	.000	11	.06	5
Warren (Warren Water District)	Tubular wells	0	43	.001	.003	2.9	.36	.000	14	.06	4
(West Warren Water Co.)	Dug wells	9	50	.001	.023	1.8	.18	.000	22	.39	3
Wayland	Tubular wells	1	97	.003	.004	6.0	.90	.000	45	.10	4
Webster	Tubular wells	2	46	.005	.017	3.3	.23	.000	22	.10	6

Averages of Chemical Analyses of Ground-Water Sources, etc.—Concluded

(Parts per Million)

City or Town	Source	Color	Residue on Evaporation	Ammonia		Chlorides	Nitrogen as		Hardness	Iron	Number of Samples Collected
				Free	Albuminoid		Nitrates	Nitrites			
Wellesley	Tubular wells at pumping station No. 1	1	92	.001	.012	8.2	.57	.000	40	.17	4
	Dug well at pumping station No. 2	0	85	.002	.009	7.9	.64	.000	38	.06	4
	Large tubular well at pumping station No. 3	1	80	.000	.005	6.7	.71	.000	35	.07	4
Westborough	Filter basin	5	33	.002	.057	2.9	.04	–	12	.09	4
West Brookfield	Tubular wells	0	49	.000	.007	2.7	.11	.000	16	.12	3
Westford (Water Co.)	Tubular wells (Westford)	0	56	.000	.003	2.2	.06	.000	27	.05	3
Weston	Tubular wells at Warren Avenue	0	99	.000	.011	7.9	1.9	.000	50	.05	4
	Tubular wells at Kendal Green	2	73	.000	.011	5.8	.55	.000	33	.12	4
Weston (Water Co.)	Dug wells	4	89	.004	.028	5.9	.26	.000	43	.13	7
West Stockbridge (East Mountain Water Co.)	Johnson's Spring	0	111	.000	.013	1.6	.09	.000	81	.07	2
	Blake's Spring	0	137	.000	.005	1.5	.12	.000	108	.06	2
Westwood (Water Co.)	Tubular wells	2	81	.000	.018	7.7	1.3	.000	36	.13	9
Wilmington	Tubular wells	0	65	.000	.007	4.9	.44	.000	27	.05	10
Winchendon	Old dug well	8	42	.057	.032	1.9	.17	.000	21	3.2	4
	New dug well	4	31	.054	.023	1.4	.13	.000	13	.39	4
Woburn	Gravel-packed well A	3	123	.017	.035	12.1	.44	.000	62	.05	6
	Gravel-packed well B	1	120	.060	.040	12.4	.39	.000	62	.06	6
	Gravel-packed well C	0	82	.000	.021	8.3	.57	.000	44	.06	4
	Gravel-packed well D	1	80	.003	.024	9.0	.31	.000	41	.06	6
Worthington (Fire District)	Springs	5	28	.000	.013	1.2	.07	.000	15	.18	3
Wrentham	Large tubular wells	0	58	.000	.008	4.2	2.7	.000	31	.06	3
Yarmouth	Tubular wells	0	45	.000	.003	13.4	.15	.000	12	.08	3

Sanitary Protection of Public Water Supplies

During the year 1936 rules and regulations were adopted by the Department in accordance with Section 160 of Chapter 111 of the General Laws for the purpose of preventing pollution and securing the sanitary protection of the waters of Long Pond, a source of water supply for the Housatonic Water Works Company in the town of Great Barrington, and for the protection of the waters of Lake Pleasant, used by the Turners Falls Fire District in the town of Montague.

The cities, towns, fire and water districts, and water companies, for which rules and regulations have been adopted by the Department are as follows:

Abington and Rockland	1927	Cambridge	1899
Adams (Fire District)	1921	Cheshire (Water Company)	1933
Amherst (Water Company)	1931	Chester (Fire District)	1914
Andover	1908	Chicopee	1906
Ashburnham	1922	Clinton	1935
Ashfield (Water Company)	1923	Cohasset (Water Company)	1923
Athol	1934	Colrain (Fire District)	1932, 1934*
Attleboro	1926	Concord	1910
Braintree	1913, 1926*	Dalton (Fire District)	1919
Brockton	1905, 1934*	Danvers and Middleton	1920

*Readopted.

Deerfield (So. Deerfield Water Supply District)	1932
Easthampton	1904
Egremont (So. Egremont Water Company)	1932
Fall River	1907
Falmouth	1930
Fitchburg	1903, 1907, 1918*
Gardner	1910
Gloucester	1930
Great Barrington (Housatonic Water Works Company)	1929, 1936*
Greenfield	1904
Hatfield	1934
Haverhill	1921
Hingham and Hull (Hingham Water Co.)	1912
Holden	1914, 1935*
Holyoke	1908, 1918*
Hudson	1929
Lakeville (State Sanatorium)	1926
Lee (Berkshire Water Company)	1919
Leicester (Cherry Valley and Rochdale Water District)	1914
Lenox (Water Company)	1933
Leominster	1919, 1927*
Lincoln and Concord	1903
Lynn	1907
Manchester	1934
Marlborough	1901
Maynard	1907
Medfield (State Hospital)	1922
Metropolitan Water District	1925
Milford (Water Company)	1924
Montague (Turners Falls Fire District)	1908, 1936*
New Bedford	1932
Newburyport	1921
Norfolk (State Hospital)	1926
Northampton	1904
North Andover	1912
Northborough	1905, 1934*
North Brookfield	1935
Norwood	1901
Palmer (Fire District No. 1)	1933
Peabody	1922
Pittsfield	1903, 1909*
Plymouth	1908
Randolph and Holbrook	1926
Rockport	1902
Russell	1910
Rutland	1914, 1935*
Salem and Beverly	1901
Scituate	1927
Southbridge (Southbridge Water Supply Company)	1931
Spencer	1934
Springfield	1904, 1910*
Stockbridge (Water Co.)	1910
Taunton	1932
Wakefield	1904
Westborough	1929
Westfield	1922
West Springfield	1907
Weymouth	1903, 1935*
Williamsburg	1914
Winchester	1909
Worcester	1926

*Readopted.

Acquisition of Land for Protection of Water Supplies

During the year eight applications were received for the approval of the Department for the purchase or taking of lands for the protection of sources of public water supply. In all cases a hearing relative to the taking was given by the Department under the provisions of Section 41 of Chapter 40 of the General Laws. These acquisitions are shown in the following table:

Purchase or Taking of Land During the Year 1936 for the Purpose of Protecting Sources of Water Supply

Water Supply of	Source of Supply		Location of Land	Approximate Area of Land in Proposed Taking (Acres)
	Source	Location		
Amherst	Amethyst Brook	Pelham	Pelham	157
	Atkins Pond	Shutesbury	Amherst	2.5
			Shutesbury	127.6
Amherst	Amethyst Brook	Pelham	Pelham	114
Amherst	Amethyst Brook	Pelham	Pelham	4.5
Amherst	Amethyst Brook	Pelham	Pelham	4.8
Kingston	Tubular Wells	Kingston	Kingston	37.8
Montague	Lake Pleasant	Montague	Montague	115.2
	Willis Hill Reservoir	Montague	Montague	22.7
Salem and Beverly	Wenham Lake	Wenham and Beverly	Wenham	0.9
Weymouth	Great Pond	Weymouth	Weymouth	1.8

Consumption of Water

Records relative to water consumption received from cities and towns throughout the State show a slight increase in consumption of water in 1936 over the year 1935. The water consumption records of the Metropolitan Water District, where approximately one and one-half million persons are supplied with water, showed an increase of about 2% over that for the same period of the year 1935. This increase is believed to have been due to the deficiency in rainfall during the months of May, June and July, resulting in a short drought and increased demands for water for sprinkling lawns and similar purposes. There also was an increase in the industrial demands for water in certain areas. The only shortages in water supplies reported to the Department were those in the city of Pittsfield which required approval by this Department for the taking of water from Onota Lake, and in the city of Lawrence when that city was obliged to take water from neighboring municipalities during the period of the flood in March.

The elevation of the water in Wachusett Reservoir on December 31, 1936, was 5.7 feet below the spillway of the dam or approximately 6.3 feet higher than on the same date in 1935, although the elevation of the water in the reservoir on December 5, 1936, was 13.4 feet below the spillway, the lowest point to which this reservoir has been reduced during the past four years. It has been estimated that in consequence of the flood during the month of March and the high flows of April, 1936, there were wasted from Wachusett Reservoir about 17,300 million gallons and that there were diverted into this reservoir from the Ware River from the March floods 2,079 million gallons.

The average daily water consumption in the various cities and towns where records are kept and submitted to this Department, the estimated population in these cities and towns and the per capita water consumption are shown in the following table:

Average Daily Consumption of Water in Various Cities and Towns in 1936

City or Town	Population 1936	Gallons	Gallons per Inhabitant
Metropolitan Water District			
Arlington	39,028	2,197,000	56
Belmont	25,447	1,384,000	54
Boston	825,018	90,112,000	109
Chelsea	42,673	3,240,000	76
Everett	47,228	4,554,000	96
Lexington	11,082	668,000	60
Malden	57,277	3,913,000	68
Medford	61,790	3,290,000	53
Melrose	24,473	1,517,000	62
Milton	18,489	1,005,000	54
Nahant	1,766	218,000	123
Quincy	77,894	5,306,000	68
Revere	35,319	2,136,000	60
Somerville	100,773	9,352,000	93
Stoneham	10,997	693,000	63
Swampscott	10,507	853,000	81
Watertown	36,010	2,058,000	57
Winthrop	17,031	1,156,000	68
Abington and Rockland	13,624	675,000	49
Acton	2,665	118,000	44
Acushnet	3,951	69,000	17
Agawam	7,228	387,000	54
Amesbury	10,514	763,000	73
Amherst	6,590	622,000	94
Andover	10,657	1,095,000	103
Ashburnham	2,051	110,000	54
Ashland	2,517	240,000	95
Athol	10,766	612,000	57
Attleboro	21,848	1,308,000	60
Avon	2,362	126,000	53
Ayer	4,021	186,000	46
Barnstable	8,190	526,000	64
Bedford	3,301	168,000	51
Belchertown	4,008	33,000	8
Beverly	26,028	1,673,000	64
Billerica	6,804	299,000	44
Blandford	469	15,000	32
Braintree	17,404	1,416,000	81
Bridgewater	9,230	215,000	23
Brockton	62,407	3,449,000	55
Brookfield	1,309	82,000	63
Brookline	50,885	4,846,000	95
Cambridge	118,961	12,479,000	105
Canton	6,643	588,000	89
Chatham	2,074	160,000	77
Chelmsford	7,710	256,000	33
Chicopee	41,952	3,794,000	90
Clinton	12,373	931,000	75
Cohasset	3,485	305,000	88
Concord	7,772	487,000	63
Danvers and Middleton	16,097	1,157,000	72
Dartmouth	9,553	264,000	28
Dedham	15,418	980,000	64
Douglas	2,444	177,000	72
Dracut	6,500	245,000	38
Dudley	4,629	214,000	46
Duxbury	2,353	234,000	100
East Bridgewater	3,686	175,000	47
East Brookfield	949	36,000	38
Easthampton	10,486	897,000	86
East Longmeadow	3,385	98,000	29
Easton	5,294	383,000	72
Edgartown	1,423	162,000	114
Fairhaven	11,016	451,000	41
Fall River	117,842	6,175,000	52
Falmouth	6,880	844,000	123
Fitchburg	41,902	4,429,000	106
Foxborough	5,931	581,000	98
Framingham	22,739	1,450,000	64
Franklin	7,587	660,000	87
Gardner	20,597	953,000	46
Georgetown	2,040	26,000	13
Gloucester	24,164	1,889,000	78
Grafton	7,811	141,000	18
Greenfield	15,983	1,521,000	95
Groton	2,554	251,000	98
Groveland	2,219	70,000	32
Hanover	2,709	143,000	53

Average Daily Consumption of Water in Various Cities and Towns in 1936
—Concluded

City or Town	Population 1936	Gallons	Gallons per Inhabitant
Hanson and Pembroke	4,110	107,000	26
Haverhill	49,677	3,867,000	78
Hingham and Hull	10,198	1,679,000	165
Holden	3,923	92,000	23
Holliston	2,937	103,000	35
Holyoke	56,139	7,698,000	137
Hudson	8,500	480,000	56
Ipswich	6,340	269,000	42
Kingston	2,757	245,000	89
Lancaster	2,590	71,000	27
Lawrence	87,128	5,151,000	59
Lenox	2,706	299,000	110
Lincoln	1,589	358,000	225
Littleton	1,546	71,000	46
Longmeadow	5,238	207,000	40
Lowell	100,114	5,849,000	58
Ludlow	8,569	353,000	41
Lynn	100,909	7,799,000	77
Lynnfield	1,956	49,000	25
Manchester	2,509	380,000	151
Mansfield	6,579	537,000	82
Marblehead	10,474	757,000	72
Marion	1,913	209,000	109
Marlborough	15,820	702,000	44
Marshfield	2,163	319,000	147
Mattapoisett	1,718	115,000	67
Maynard	7,101	361,000	51
Medfield	4,181	73,000	17
Medway	3,291	219,000	67
Merrimac	2,209	212,000	96
Methuen	21,074	1,149,000	55
Middleborough	8,916	312,000	35
Milford and Hopedale	18,148	798,000	44
Millbury	6,897	550,000	80
Millis	2,170	184,000	58
Montague and Erving	9,250	880,000	95
Nantucket	3,495	580,000	166
Natick	14,555	923,000	63
Needham	12,024	661,000	55
New Bedford	110,022	9,420,000	86
Newburyport	14,815	1,376,000	93
Newton	66,317	4,990,000	75
North Adams	22,178	2,838,000	128
North Andover	7,204	468,000	65
North Attleborough	10,203	790,000	77
Northbridge	10,750	684,000	64
North Brookfield	3,320	295,000	89
Norton	2,962	128,000	43
Norwood	15,679	1,340,000	85
Oak Bluffs	1,722	157,000	91
Oxford	4,310	232,000	54
Paxton	742	2,300	3
Peabody	22,229	2,978,000	134
Pepperell	3,020	273,000	90
Pittsfield	47,516	5,795,000	122
Plainville	1,610	85,000	53
Plymouth	13,211	1,150,000	87
Provincetown	4,124	429,000	104
Randolph and Holbrook	11,152	649,000	58
Reading	10,890	681,000	63
Rockport	3,635	347,000	95
Rutland	2,406	245,000	102
Salem	43,496	4,242,000	98
Salisbury	2,256	281,000	125
Saugus	15,151	916,000	60
Scituate	3,991	553,000	138
Sharon	3,749	425,000	113
Shelburne	1,618	87,000	54
Shirley	2,572	66,000	26
Shrewsbury	7,191	303,000	42
Somerset	5,707	189,000	33
Southborough	2,109	76,000	36
Southbridge	16,091	832,000	52
Southwick	1,556	29,000	18
Springfield	149,642	15,187,000	101
Sterling	1,567	10,000	6
Stockbridge	1,953	244,000	125
Stoughton	8,533	652,000	76
Taunton	37,446	2,855,000	76
Tisbury	1,878	270,000	144
Townsend	1,980	62,000	31
Uxbridge	6,419	254,000	40
Wakefield	16,529	712,000	43
Walpole	7,484	1,025,000	137
Waltham	40,819	2,416,000	59
Ware	7,795	378,000	48
Wareham	6,119	453,000	74
Warren	3,662	82,000	22
Wayland	3,428	341,000	99
Webster	14,006	737,000	53
Wellesley	13,763	1,298,000	94
WestBridgewater	3,386	194,000	57
West Brookfield	1,259	40,000	32
Westfield	18,788	2,012,000	107
Westford	3,827	178,000	47
Weston	3,951	279,000	71
West Springfield	17,205	2,098,000	122
Weymouth	21,921	1,387,000	63
Whitman	7,591	301,000	40
Wilbraham	3,019	56,000	19
Wilmington	4,589	205,000	45
Winchester	13,501	953,000	71
Woburn	19,747	1,805,000	91
Worcester	190,471	15,734,000	83
Wrentham	4,275	144,000	34
Yarmouth	2,155	96,000	45

Climatological Data

The general weather conditions throughout this State in 1936 for each month were as follows: In order to understand the causes of the great flood of March, 1936, the weather during December, 1935, should be reviewed. The following table shows that it was a decidedly cold month, the average daily deficiency being 5 degrees (F) persistent throughout the State and New England; there were only two short periods with the temperature slightly above normal. The snowfall was deficient. Conditions were ideal for the formation of clear thick ice and the freezing of the soil to a considerable depth. In the vicinity of Boston the minimum temperature from December 17 to the end of the month did not exceed 27 degrees (F).

The average daily mean temperatures in the vicinity of Boston for the winter of 1935–1936 were as follows:

DEGREES FAHRENHEIT

	Normal	Actual	Excess or Deficiency
December	32.1	27.1	−5.0
January	27.9	28.2	+0.3
February	28.9	22.8	−6.1
March	35.6	41.8	+6.2

During the first half of January the temperature was somewhat above normal and a considerable rainfall occurred on the 3rd and 4th throughout New England; this was followed by severe winter weather, subnormal temperature and snowfall which at the end of the month amounted to from about a foot here to approximately four feet in upper Vermont, New Hampshire and Maine. The minimum daily temperature was less than 30 degrees (F) from the 14th to the end of the month.

The weather in February continued decidedly cold throughout the month with the mean daily temperature rarely above the freezing point and very few days when it was above normal. The snowfall was about normal making the accumulated snow cover from 15 inches to around three feet in the northern states, and showing that there had been some settlement in the snow depth from the previous month.

Up to the first of March the winter had been most severe, but this month proved to be one of the outstanding warm Marches, only two exceeding it in the vicinity of Boston in the past 49 years, while in the central portion of the State the records show that March, 1936, was the warmest except 1903 and 1921 since 1837 or in 100 years. The early days of March were quite normal with one hard freeze and a moderate snowstorm. On the ninth a rise in temperature started and continued except as noted throughout the month; there was practically no night time freezing except in the northern portions of New England. Thawing occurred during most of the day time augmented by precipitation which started on the ninth and continued with only slight interruption through the eleventh. Amounts of from 3 to 7 inches were recorded; this, together with the breaking up of ice, resulted in flood conditions only somewhat less than in November, 1927. This primary flood was halted on the 14th, 15th and 16th by temperatures somewhat below freezing, but rain again began in Maine, New Hampshire and Vermont on the 16th and was almost continuous through the 22nd, the amount being apparently unequalled as far as available records show. This great rainfall together with the melting snow cover which was reduced approximately 20 inches in the northern states caused a tremendous volume of water to enter the streams in a relatively short time. The ground absorption must have been very small owing to the long continuous snow cover and the frozen condition of the ground beneath. Great disaster and suffering followed this, the greatest flood of which we have any record.

The month of April maintained fairly normal temperatures and total rainfall. A warm wave occurred near the end of the month. The rainfall was well distributed, occurring nearly every day and causing a large amount of cloudiness. The monthly relative humidity was somewhat above the mean.

May was much warmer than usual with a high percentage of sunshine and a deficient rainfall. The temperature has been exceeded but a few times since 1888. A serious frost occurred in the middle of the month. The relative humidity was slightly below the mean. The entire eastern section of the State received less than two inches of rain.

In general, June was quite normal in most respects, the first half of the month being somewhat warmer while the latter half was slightly cooler than usual. The rainfall was somewhat above the normal for the central and southeastern portions and from 1 to 1½ inches below normal over the rest of the State. The relative humidity was practically normal.

The weather during July was generally clear and dry with the mean temperature but slightly above the normal. Throughout the State the maximum temperatures were well above 90 degrees (F) on the 8th and 9th. The relative humidity was somewhat less than normal. The rainfall was very deficient, except for a small area in the extreme northeasterly portion of the State. Long time records show only two Julys having less rainfall in the past 73 years. The accumulative precipitation for the period January to July, inclusive, was 3.04 inches in excess of the normal, but this figure represents very excessive precipitation during the months of January and March, the rainfall contributing to the great flood. By the latter

part of July, due to a deficiency of 3.87 inches in rainfall for the months of April to July, inclusive, a shortage of water seemed possible notwithstanding the great excess of 6.91 inches during January to March, inclusive.

The month of August was generally somewhat warmer than usual and there was a well distributed excessive rainfall throughout the State, most of it occurring during the latter part of the month. In the eastern section the humidity was slightly above the normal and in the rest of the State was somewhat lower.

September was quite normal as to temperature and humidity up to the end of the month when a rather early frost covered the State. Heavy rains occurred on the Cape during the progress northeastward of a tropical storm on the 18th which caused heavy damages by gales, floods and high tides. Many stations reported an excess of rainfall of eight inches. The rainfall throughout the State was well above the normal and stream flows were but slightly below the normal.

The month of October began with a storm of great intensity but the rainfall throughout the State for the month was somewhat below normal. There were two mild temperature periods followed by a decidedly cold wave in the interior of the State with stations reporting the lowest readings for this month since 1928. The relative humidity for the month was somewhat above the normal as were also the stream flows.

Warm weather prevailed during the early and middle parts of the month of November but the latter part was persistently subnormal in temperature, many stations reporting low readings rarely exceeded for many years. Ice formed and snow fell very generally throughout the State on the 24th, somewhat later than usual. The precipitation was very deficient which together with the low temperatures caused the stream flows to fall off to about half the normal November flow. The relative humidity was somewhat less than normal.

The month of December was considerably warmer than usual and with a large excess of precipitation mostly in the form of rain; only about one-third of the normal amount of snow was recorded. The total precipitation was the greatest for this month for the 123 years of record at New Bedford and only exceeded in the vicinity of Boston in 1901 and 1869 for the record of 119 years. The excess was not so great in the central and western portions of the State but sufficient to cause the flow in streams to be not quite twice the average for this month.

The monthly normal and actual mean temperatures for the vicinity of Boston for 1936 are shown in the following table:

Degrees Fahrenheit

	Normal	1936		Normal	1936
January	27.9	28.2	July	71.7	71.1
February	28.9	22.8	August	69.9	69.7
March	35.6	41.8	September	63.2	62.6
April	46.4	45.2	October	53.6	54.4
May	57.1	60.6	November	42.0	39.5
June	66.5	66.2	December	33.0	35.0

The following table has been prepared to show the monthly mean and the maximum and minimum temperature for each month in 1936 for Boston, Worcester, Amherst and Pittsfield.

Temperatures

(Degrees Fahrenheit)

1936	Boston			Worcester			Amherst			Pittsfield		
	Mean	Max.	Min.	Mean	Max.	Min.	Mean	Max.	Min.	Mean	Max.	Min.
January	28	54	4	24	51	−5	24	50	−6	19	45	−7
February	23	41	4	19	44	−3	18	45	−12	16	45	−8
March	42	70	15	41	71	5	41	72	7	39	70	2
April	45	80	29	43	79	24	43	79	25	41	79	20
May	61	91	34	59	90	30	59	91	32	60	90	27
June	66	85	52	65	90	42	67	90	44	65	90	40
July	71	98	57	69	97	42	71	98	44	70	99	41
August	70	94	51	69	92	44	70	92	49	69	95	44
September	63	90	41	62	88	31	61	88	32	60	87	30
October	54	79	25	51	79	19	50	77	17	49	76	14
November	40	48	32	40	45	26	39	45	26	37	67	4
December	35	59	10	32	56	5	32	55	7	31	55	0
Year	50	98	4	48	97	−5	48	98	−12	46	99	−8
Normal *	50 (46 yrs.)			48 (40 yrs.)			47 (47 yrs.)			46 (16 yrs.)		

* Normals are computed and changed every five years.

Rainfall

The average rainfall in the State for the year ending December 31, 1936, as recorded at seven long-term stations located in different parts of the State was 51.97 inches which is 7.40 inches in excess of the normal. There was a deficiency in rainfall during the months of February, April, May, June, July, October and November; the months of excess rainfall were well distributed with the result that the year was favorable to water supplies throughout the State. For the climatological year ending September 30, 1936, there was an excess of 1.86 inches.

The following table shows the normal rainfall as deduced from the records of the seven long-term stations, each record exceeding 60 years in length; also the rainfall for the year 1936 and the excess or deficiency of precipitation during each month as compared with the normal.

Month	Normal Rainfall (Inches)	Rainfall in 1936 (Inches)	Excess or Deficiency in 1936 (Inches)
January	3.81	7.28	+3.47
February	3.56	2.85	−0.71
March	3.98	8.13	+4.15
April	3.71	3.69	−0.02
May	3.54	1.60	−1.94
June	3.36	2.91	−0.45
July	3.70	2.24	−1.46
August	4.14	5.05	+0.91
September	3.60	5.17	+1.57
October	3.66	3.16	−0.50
November	3.82	1.56	−2.26
December	3.69	8.33	+4.64
Totals	44.57	51.97	+7.40

Flow of Streams

In those streams where records have been kept by this Department for a number of years the average flow during 1936 has been somewhat greater than the normal.

Sudbury River

The average yield of the Sudbury River during the year 1936 was 2.062 cubic feet per second, or 1,332,000 gallons per day per square mile of drainage area. The normal flow of this stream for the 62 years during which records have been maintained by this Department is 1.509 cubic feet per second, or 975,000 gallons per day per square mile. The average daily yield for the past year during the six driest months, June to November, inclusive, was 163,900 gallons per day per square mile, or 57.8 per cent less than the normal.

The following table shows the relation between the average daily yield of the Sudbury River per square mile in each month of the year 1936 and the normal yield of the river during the past 62 years. The drainage area of the Sudbury River at the point of measurement is 75.2 square miles.

Table Showing the Average Daily Yield of the Sudbury River for Each Month in the Year 1936, in Cubic Feet per Second per Square Mile of Drainage Area, and in Million Gallons per Day per Square Mile of Drainage Area; also Departure from the Normal.

Month	Normal Yield		Actual Yield in 1936		Excess or Deficiency	
	Cubic Feet per Second per Square Mile	Million Gallons per Day per Square Mile	Cubic Feet per Second per Square Mile	Million Gallons per Day per Square Mile	Cubic Feet per Second per Square Mile	Million Gallons per Day per Square Mile
January	1.755	1.134	2.469	1.596	+.714	+.462
February	2.291	1.481	1.264	.817	−1.027	−.664
March	4.208	2.720	10.019	6.476	+5.811	+3.756
April	3.119	2.016	3.600	2.327	+.481	+.311
May	1.671	1.080	1.256	.812	−.415	−.268
June	.801	.518	.292	.189	−.509	−.329
July	.291	.188	−.146	−.094	−.437	−.282
August	.312	.202	.018	.012	−.294	−.190
September	.417	.269	.373	.241	−.044	−.028
October	.611	.395	.538	.348	−.073	−.047
November	1.186	.766	.457	.295	−.729	−.471
December	1.499	.969	4.437	2.868	+2.936	+1.899
Average for Whole Year	1.509	.975	2.062	1.332	+.553	+.357

The rainfall on the Sudbury River watershed and the total yield expressed in inches in depth (inches of rainfall collected) for each of the past six years, 1931–1936, inclusive, together with the average for a period of sixty-two years, are given in the following table:

Rainfall, in Inches, received and collected on the Sudbury River Drainage Area

Month	1931			1932			1933			1934		
	Rainfall	Rainfall collected	Per Cent collected	Rainfall	Rainfall collected	Per Cent collected	Rainfall	Rainfall collected	Per Cent collected	Rainfall	Rainfall collected	Per Cent collected
January	3.95	.832	21.0	4.69	1.835	39.1	2.36	1.854	78.5	3.85	3.031	78.7
February	2.57	1.649	64.3	2.59	1.384	53.4	4.09	1.539	37.6	4.36	.751	17.2
March	5.89	6.159	104.5	5.51	3.288	59.7	7.13	5.245	73.5	4.73	4.780	101.1
April	3.12	3.349	107.5	2.19	3.126	142.9	5.65	6.331	112.1	3.59	4.720	131.3
May	3.87	2.120	54.8	1.55	.819	52.8	2.49	1.300	52.1	3.70	2.283	61.7
June	7.18	3.405	47.4	3.28	.162	5.0	1.47	.205	13.9	4.53	.791	17.5
July	1.66	.557	33.5	1.92	−.175	−9.1	2.13	−.206	−9.7	2.91	−.061	−2.1
August	4.93	.229	4.6	5.21	.056	1.1	3.53	−.137	−3.9	2.10	−.058	−2.8
September	1.19	−.176	−14.8	10.57	2.185	20.7	10.25	2.118	20.7	8.56	1.411	16.5
October	2.23	−.048	−2.1	6.59	3.067	46.6	2.98	.954	32.0	3.26	1.340	41.0
November	0.95	.074	7.8	5.10	5.030	98.6	1.11	.693	62.4	2.68	1.045	38.9
December	3.29	.532	16.1	1.92	1.692	87.7	4.05	1.084	26.8	3.02	1.471	48.7
Totals and averages	40.83	18.682	45.7	51.12	22.469	43.9	47.24	20.980	44.4	47.29	21.504	45.5

Rainfall, in Inches, received and collected on the Sudbury River Drainage Area—Cont.

Month	1935			1936			Mean for Sixty-two Years, (1875-1936)		
	Rainfall	Rainfall collected	Per Cent collected	Rainfall	Rainfall collected	Per Cent collected	Rainfall	Rainfall collected	Per Cent collected
January	7.01	3.339	47.7	8.10	2.847	35.1	4.04	2.023	50.1
February	3.25	2.269	69.9	4.12	1.363	33.1	3.97	2.406	60.7
March	1.82	4.877	267.5	9.68	11.551	119.3	4.31	4.852	112.5
April	5.08	4.516	88.8	3.28	4.011	122.4	3.67	3.480	94.8
May	2.40	1.587	66.1	2.62	1.448	55.2	3.20	1.927	60.2
June	5.41	1.883	34.8	2.41	.326	13.5	3.32	.894	27.0
July	1.83	.171	9.3	1.18	−.168	−14.3	3.52	.335	9.5
August	1.63	−.150	− 9.2	5.17	.021	0.4	3.80	.360	9.5
September	3.93	.187	4.8	5.57	.417	7.5	3.64	.465	12.8
October	0.53	−.182	−34.2	2.09	.620	29.6	3.54	.704	19.9
November	4.98	.751	15.1	1.66	.510	30.8	3.75	1.323	35.3
December	1.03	.665	64.7	8.65	5.116	59.2	3.77	1.729	45.9
Totals and averages	38.90	19.913	51.2	54.53	28.062	51.5	44.53	20.498	46.0

The following table gives the record of the yield of the Sudbury River in gallons per day per square mile for each of the past six years and the mean for the past sixty-two years:

Yield of the Sudbury River Drainage Area in Gallons per Day per Square Mile [1]

Month	1931	1932	1933	1934	1935	1936	Mean for Sixty-two Years, 1875-1936
January	466,000	1,029,000	1,040,000	1,699,000	1,872,000	1,596,000	1,134,000
February	1,024,000	830,000	955,000	466,000	1,408,000	817,000	1,481,000
March	3,453,000	1,843,000	2,941,000	2,680,000	2,734,000	6,476,000	2,720,000
April	1,943,000	1,814,000	3,673,000	2,738,000	2,620,000	2,327,000	2,016,000
May	1,188,000	459,000	729,000	1,280,000	890,000	812,000	1,080,000
June	1,972,000	94,000	119,000	458,000	1,091,000	189,000	518,000
July	312,000	−98,000	−115,000	−34,000	96,000	−94,000	188,000
August	129,000	31,000	−77,000	−33,000	−84,000	12,000	202,000
September	−102,000	1,264,000	1,225,000	816,000	108,000	241,000	269,000
October	−27,000	1,719,000	535 000	751,000	−102,000	348,000	395,000
November	43,000	2,914,000	401,000	605,000	435,000	295,000	766,000
December	298,000	949,000	608,000	825,000	373,000	2,868,000	969,000
Average for whole year	889,000	1,067,000	999,000	1,024,000	948,000	1,332,000	975,000
Average for driest six months	110,000	578,000	344,000	424,000	136,100	163,900	388,000

[1] The drainage area of the Sudbury River used in making up these records included water surfaces amounting to about 2 per cent of the whole area from 1875 to 1878, inclusive, subsequently increasing by the construction of storage reservoirs to about 3 per cent in 1879, to 3.5 per cent in 1885, to 4 per cent in 1894, and to 6.5 per cent in 1898. The drainage area also contains extensive areas of swampy land, which, though covered with water at times, are not included in the above percentages of water surfaces.

Nashua River

The average yield of the South Branch of the Nashua River at the outlet of the Wachusett Reservoir in Clinton during the year 1936 was 1,547,000 gallons per day per square mile of drainage area, or 40.4 per cent above the average for the past 40 years. The average rainfall on this watershed during 1936 was 57.30 inches or 26.0 per cent in excess of the normal.

The average yield for the six driest months, June to November, inclusive, was 419,700 gallons per day per square mile of drainage area, or 25.7 per cent less than the normal for this period.

There were deficiencies in the yield during the months of February, May, June, July, August, September and November, and the yield was in excess of the normal during the remainder of the year, the excess in March being 4,435,000 and in December 1,159,000 gallons per day per square mile of drainage area.

The following table shows the normal yield of the South Branch of the Nashua River by months for the past 40 years, the actual yield in the year 1936 and the excess or deficiency in each month. The drainage area of the Nashua River above the point of measurement was 119 square miles from 1897 to 1907 and 118.19 square miles from 1908 to 1913, inclusive. Since January 1, 1914, the city of Worcester has been diverting water from 9.35 square miles of this drainage area for the supply of that city. The net drainage area tributary to Wachusett Reservoir is now 108.84 square miles.

Table showing the Average Daily Yield of the Nashua River for Each Month in the Year 1936, in Cubic Feet per Second per Square Mile of Drainage Area, and in Million Gallons per Day per Square Mile of Drainage Area; also Departure from the Normal.

Month	Normal Yield		Actual Yield in 1936		Excess or Deficiency	
	Cubic Feet per Second per Square Mile	Million Gallons per Day per Square Mile	Cubic Feet per Second per Square Mile	Million Gallons per Day per Square Mile	Cubic Feet per Second per Square Mile	Million Gallons per Day per Square Mile
January	1.875	1.212	2.866	1.853	+.991	+.641
February	1.957	1.265	1.315	.850	−.642	−.415
March	4.097	2.648	10.960	7.083	+6.863	+4.435
April	3.562	2.302	4.017	2.596	+.455	+.294
May	1.992	1.288	1.951	1.261	−.041	−.027
June	1.275	.824	.820	.530	−.455	−.294
July	.700	.453	.468	.303	−.232	−.150
August	.623	.403	.552	.357	−.071	−.046
September	.655	.423	.522	.337	−.133	−.086
October	.762	.493	.899	.581	+.137	+.088
November	1.241	.802	.635	.411	−.606	−.391
December	1.736	1.122	3.529	2.281	+1.793	+1.159
Average for whole year	1.705	1.102	2.393	1.547	+.688	+.445

The rainfall on the Nashua River watershed and the total yield expressed in inches in depth upon the watershed (inches of rainfall collected) for each of the past six years, 1931 to 1936, inclusive, together with the average for the past 40 years, are given in the following table:

Rainfall, in Inches, received and collected on the Nashua River Drainage Area

Month	1931			1932			1933			1934		
	Rainfall	Rainfall collected	Per Cent collected	Rainfall	Rainfall collected	Per Cent collected	Rainfall	Rainfall collected	Per Cent collected	Rainfall	Rainfall collected	Per Cent collected
January	3.44	.881	25.6	5.71	3.024	53.0	2.71	2.323	85.8	3.87	2.698	69.7
February	2.71	1.103	40.7	3.14	1.906	60.7	4.78	2.457	51.4	4.11	1.315	32.0
March	5.00	4.545	90.9	5.25	3.218	61.3	5.92	4.677	79.0	4.26	5.053	118.7
April	2.98	4.001	134.2	2.10	4.234	201.1	6.39	8.336	130.5	4.41	6.111	138.6
May	5.01	2.258	45.1	1.58	1.260	79.7	2.58	1.942	75.2	4.21	3.015	71.6
June	6.07	3.089	51.0	2.27	.585	25.8	1.93	.742	38.5	5.10	1.644	32.3
July	2.71	.694	25.6	3.55	.383	10.8	2.16	.401	18.6	2.35	.577	24.6
August	6.95	1.083	15.6	4.23	.503	11.9	4.68	.564	12.0	2.40	.245	10.2
September	2.04	.517	25.3	7.31	.880	12.0	10.88	3.020	27.8	9.64	1.614	16.7
October	2.46	.487	19.8	7.38	2.708	36.7	3.40	1.463	43.1	2.94	1.400	47.6
November	1.35	.546	40.5	5.21	3.992	76.7	1.68	1.034	61.6	2.76	1.757	63.7
December	3.63	1.209	33.3	2.20	1.916	87.2	3.86	1.388	35.9	4.16	2.181	52.4
Totals and averages	44.35	20.413	46.0	49.93	24.609	49.3	50.97	28.347	55.6	50.21	27.610	55.0

Rainfall, in Inches, received and collected on the Nashua River Drainage Area—Cont.

Month	1935			1936			Mean for Forty Years, (1897-1936)		
	Rainfall	Rainfall collected	Per Cent collected	Rainfall	Rainfall collected	Per Cent collected	Rainfall	Rainfall collected	Per Cent collected
January	6.80	4.014	59.0	8.03	3.304	41.2	3.84	2.162	56.3
February	3.63	2.332	64.2	2.89	1.418	49.1	3.78	2.055	54.4
March	2.19	4.927	225.5	11.04	12.635	114.5	4.16	4.723	113.7
April	4.09	3.971	97.1	3.68	4.475	121.5	3.88	3.974	102.4
May	2.67	1.997	74.9	3.45	2.249	65.1	3.30	2.297	69.6
June	5.89	2.308	39.2	2.84	.914	32.2	3.84	1.423	37.1
July	2.81	.891	31.7	2.26	.540	23.8	3.89	.807	20.7
August	2.13	.367	17.2	5.35	.636	11.9	4.02	.718	17.9
September	4.63	.678	14.6	4.71	.583	12.4	3.98	.730	18.3
October	.73	.352	48.1	3.18	1.037	32.5	3.25	.879	27.1
November	4.67	1.092	23.4	1.68	.709	42.2	3.61	1.385	38.3
December	1.18	.847	71.9	8.19	4.069	49.7	3.93	2.002	50.9
Totals and averages	41.42	23.776	57.4	57.30	32.569	56.8	45.48	23.155	50.9

The following table gives the record of the yield of the Nashua River watershed in gallons per day per square mile for each of the past six years and the mean for the past 40 years.

Yield of the Nashua River Drainage Area in Gallons per Day per Square Mile[1]

Month	1931	1932	1933	1934	1935	1936	Mean for Forty Years, 1897-1936
January	494,000	1,695,000	1,302,000	1,513,000	2,250,000	1,853,000	1,212,000
February	685,000	1,143,000	1,525,000	816,000	1,447,000	850,000	1,265,000
March	2,548,000	1,804,000	2,622,000	2,832,000	2,762,000	7,083,000	2,648,000
April	2,321,000	2,456,000	4,836,000	3,545,000	2,303,000	2,596,000	2,302,000
May	1,266,000	706,000	1,089,000	1,690,000	1,119,000	1,261,000	1,288,000
June	1,789,000	339,000	430,000	953,000	1,337,000	530,000	824,000
July	389,000	215,000	225,000	323,000	500,000	303,000	453,000
August	607,000	282,000	316,000	137,000	206,000	357,000	403,000
September	299,000	509,000	1,747,000	933,000	392,000	337,000	423,000
October	273,000	1,518,000	820,000	785,000	198,000	581,000	493,000
November	316,000	2,313,000	599,000	1,018,000	633,000	411,000	802,000
December	678,000	1,074,000	778,000	1,223,000	475,000	2,281,000	1,122,000
Average for Whole Year	972,000	1,169,000	1,350,000	1,315,000	1,132,000	1,547,000	1,102,000
Average for Driest Six Months	428,000	597,000	682,300	687,100	399,150	419,700	564,400

[1] The drainage area used in making up these records included water surfaces amounting to 2.2 per cent of the whole area from 1897 to 1902, inclusive, to 2.4 per cent in 1903, to 3.6 per cent in 1904, to 4.1 per cent in 1905, to 5.1 per cent in 1906, to 6 per cent in 1907, to 7 per cent in 1908, 1909 and 1910, to 6.5 per cent in 1911, to 6.8 per cent in 1912, to 7 per cent in 1913, to 7.4 per cent in 1914 and 1915, to 7.6 per cent in 1916, to 7.4 per cent in 1917 and 1918, to 7.5 per cent in 1919, 1920, 1921 and 1922, to 7.4 per cent in 1923 and 1924, to 6.4 per cent in 1925, to 5.9 per cent in 1926, to 5.7 per cent in 1927, to 7.6 per cent in 1928, to 7.4 per cent in 1929, to 5.6 per cent in 1930, to 6 per cent in 1931, to 7.3 per cent in 1932, to 7.6 per cent in 1933 to 7.6 per cent in 1934, to 7.6 per cent in 1935, and 7.4 per cent in 1936.

Merrimack River

The Merrimack River is the second largest stream in the State of Massachusetts. It rises in the White Mountains in the State of New Hampshire and flows southerly through the central part of that state until it enters Massachusetts, where it turns to the east and flows in a general northeasterly direction the remainder of its course to the sea. The total length of its watershed from its extreme northerly limits in the mountains of northern New Hampshire to its extreme southerly limits in the hills of Hopkinton, Massachusetts, is about 137 miles and its extreme width is about 66 miles. The total drainage area above the mouth of the river at Newburyport comprises about 5,000 square miles, of which about one-quarter or 1,250 square miles are within the limits of Massachusetts and three-quarters or 3,750 square miles are within the State of New Hampshire.

Records of the flow of the Merrimack River have been kept continuously at Lawrence in the office of the Essex Company since 1880. The original drainage area of the river at that point was 4,663 square miles and included 118.19 square miles tributary to the South Branch of the Nashua River used for the water supply of the Metropolitan Water District and in part for the city of Worcester, 75.2 square miles on the Sudbury River, and 18 square miles tributary to Lake Cochituate. The flow as measured at Lawrence includes the water wasted from these drainage areas. In presenting the record of the flow of the river these drainage areas have been deducted, leaving the net drainage area above Lawrence 4,567 square miles in 1880, 4,570 square miles in 1891 to 1897, inclusive, and 4,452 square miles since that date. The quantity of water overflowing from the Cochituate and Sudbury watersheds as measured by the Metropolitan District Commission also has been deducted from the flow of the river as measured at Lawrence. The average flow of the river during the year 1936 amounted to 2.164 cubic feet per second per square mile, which is 46.7 per cent more than normal for the past 57 years. The flow was more than normal during the months of January, February, March, April, October and December and less than the normal during the months of May, June, July, August, September and November. The greatest deficiency occurred in the month of June.

The following table shows the relation between the normal flow of this stream during the past 57 years and the actual flow during each month of the year 1936:

Table Showing the Average Monthly Flow of the Merrimack River at Lawrence for the Year 1936; also the Normal and Departure therefrom in Cubic Feet per Second per Square Mile of Drainage Area.

Month	Normal Flow 1880-1936	Actual Flow in 1936	Excess or Deficiency
January	1.299	1.687	+ .388
February	1.399	1.413	+ .014
March	2.830	10.408	+7.578
April	3.631	4.477	+ .846
May	2.212	1.867	− .345
June	1.250	.705	− .545
July	.752	.478	− .274
August	.635	.359	− .276
September	.650	.411	− .239
October	.798	.889	+ .091
November	1.139	.969	− .170
December	1.109	2.306	+1.197
Average for whole year	1.475	2.164	+ .689

The following table gives the record of the flow of the Merrimack River at Lawrence for each of the past six years, together with the average flow in the past 57 years, this amount being expressed in cubic feet per second per square mile of drainage area.

Flow of the Merrimack River at Lawrence in Cubic Feet per Second per Square Mile

Month	1931	1932	1933	1934	1935	1936	Mean for Fifty-seven Years, 1880-1936
January	.423	1.803	1.333	1.468	3.039	1.687	1.299
February	.478	1.301	1.295	1.248	1.994	1.413	1.399
March	1.603	1.363	2.392	2.434	3.020	10.408	2.830
April	3.665	4.454	7.363	6.042	3.313	4.477	3.631
May	1.897	1.319	2.144	2.325	2.025	1.867	2.212
June	2.207	.493	.816	.957	2.292	.705	1.250
July	.756	.499	.406	.479	1.204	.478	.752
August	.520	.483	.509	.450	.515	.359	.635
September	.471	.673	.971	.939	.613	.411	.650
October	.471	1.223	1.367	1.210	.425	.889	.798
November	.621	2.431	1.157	1.475	.859	.969	1.139
December	.973	1.157	1.187	1.591	1.141	2.306	1.109
Average for whole year	1.174	1.433	1.745	1.718	1.703	2.164	1.475
Average for driest six months	.635	.782	.871	.918	.793	.635	.847

Weekly Flow of the Sudbury, Nashua and Merrimack Rivers

The following table shows the weekly fluctuations during the year 1936 in the yield of the Sudbury River at Framingham, the South Branch of the Nashua River at the outlet of the Wachusett Reservoir in Clinton and the Merrimack River at Lawrence. The flow of these streams, particularly that of the Sudbury River and the South Branch of the Nashua River, serves to indicate the flow of other streams in eastern Massachusetts. The area of the Sudbury River watershed is 75.2 square miles, of the South Branch of the Nashua River 118.19 square miles, and of the Merrimack River at Lawrence 4,452 square miles.

Table Showing the Average Weekly Flow of the Sudbury, South Branch of the Nashua and the Merrimack Rivers for the Year 1936, in Cubic Feet per Second per Square Mile of Drainage Area

Week Ending Sunday—	Yield of Sudbury River	Yield of South Branch Nashua River	Flow of Merrimack River	Week Ending Sunday—	Yield of Sudbury River	Yield of South Branch Nashua River	Flow of Merrimack River
Jan. 5	1.608	2.654	.872	July 5	—.041	.300	.471
12	2.670	2.325	1.555	12	—.101	.607	.484
19	4.009	5.272	2.128	19	—.229	.293	.490
26	2.171	1.669	1.893	26	—.126	.819	.435
Feb. 2	.869	1.174	1.673	Aug. 2	.964	.174	.470
9	.912	1.178	1.498	9	—.093	.536	.373
16	.955	1.287	1.363	16	—.623	.400	.404
23	2.296	1.546	1.413	23	—.125	.770	.363
Mar. 1	1.635	1.275	1.321	30	.193	.646	.346
8	2.157	1.586	1.393	Sept. 6	—.002	.310	.437
15	16.343	13.950	8.216	13	.133	.417	.453
22	15.271	23.806	21.672	20	.884	.801	.355
29	8.006	7.695	12.467	27	.409	.393	.410
Apr. 5	4.973	5.004	6.225	Oct. 4	.781	.967	.348
12	5.180	5.995	6.210	11	.387	.494	.475
19	3.637	4.169	4.505	18	.528	1.358	.563
26	1.808	2.328	3.150	25	.662	1.108	1.526
May 3	1.425	2.246	2.513	Nov. 1	.279	.512	1.272
10	2.323	2.688	2.559	8	.696	.988	1.367
17	1.602	2.408	1.908	15	.686	.690	1.230
24	.846	1.595	1.504	22	.019	.415	.848
31	.387	.798	1.046	29	.512	.514	.529
June 7	—2.394	.731	.835	Dec. 6	2.041	1.373	.694
14	.096	1.052	.567	13	5.666	4.975	1.955
21	1.040	1.151	.836	20	5.004	4.458	2.555
28	.099	.467	.598	27	5.485	3.452	3.757

Examination of Rivers

The principal streams in the State have been examined throughout the year by the engineers with the assistance of the Water and Sewage Laboratories and the Lawrence Experiment Station in the exercise of the oversight of inland waters under Chapter III of the General Laws, and during the six months from June to November, inclusive, samples were regularly collected from the more important streams for chemical analysis and dissolved oxygen determinations, while at some sampling points bacterial examinations were made of the samples collected. In general, there has been no serious deterioration in the condition of the various streams during the past year, although certain streams viz., the Aberjona River, the Hoosick River, and the French River, as examples, have been found to be grossly polluted.

Aberjona River

The Department has been required to spend a considerable amount of time in connection with the pollution of the Aberjona River within the past year. Many conferences have been held with the engineers of the Sewerage Division of the Metropolitan District Commission in connection with the construction of the North Metropolitan Relief Sewer which in part at least is for the relief of the pollution of the Aberjona River. The Department has urged the cleaning of certain existing sewers in order to prevent further overflows and has assisted in some of this work.

Analyses of the samples of water collected from the Aberjona River during 1936 have shown a considerable increase in pollution due to the overflow of sewage both in Woburn and Winchester, and special observations have shown that the capacity of the Aberjona River Sewer of the city of Woburn is inadequate. Under date of August 25, 1936, the Department recommended that the city of Woburn investigate the condition of this sewer with a view to removing any obstructions and regulating so far as practicable the discharge of industrial wastes into it. This matter was under consideration at the end of the year. It is to be assumed that the new North Metropolitan Relief Sewer will be in operation some time during the summer of 1937, but sewage must inevitably enter the river from the city of Woburn unless

the capacity of the Aberjona River Sewer of that city is increased. The discharge of sewage and wastes into the upper reaches of the Aberjona River has been such as to cause certain land owners along the stream to institute legal proceedings.

Blackstone River

Under the provisions of Chapter 49 of the Resolves of 1936 the Department during the year co-operated with the Works Progress Administration in an investigation of the sanitary condition of the Blackstone River, and the results of this investigation have been reported to the Legislature in Senate Document No. 50 of 1937. In addition, the report of an investigation carried on as a Works Progress Administration State Planning Project has been prepared for distribution, this report being dated September 1936, copies of which have been sent to members of the Legislature in the valley and to others. The Blackstone River Valley District Board created by Chapter 248 as amended by Chapter 410 of the Acts of 1936 has held several meetings and hearings during the year but no work had been started in the improvement of this stream by the end of the year. The results of the analyses show that this stream continues to be seriously polluted, particularly by industrial wastes from Worcester and the sewage and industrial wastes from Millbury and Uxbridge.

Charles River

The results of the analyses of samples collected during 1936 from the Charles River have shown an increase in pollution below Milford, due in part to the discharge into the river of untreated sewage at times in connection with the construction of the new treatment works at Milford, but in other portions of the course of this stream there has been little change. During the early summer and again in the fall, various complaints were made to the Department relative to the pollution of the stream in the vicinity of Medway, and after an investigation the Department recommended the construction of works for the prevention of the pollution of the Charles River by wastes from certain woolen mills in Medway in order that action by the Department would not be required under the provisions of Section 175 of Chapter 111 of the General Laws. The Department's recommendations resulted in the town of Medway engaging engineering services during the latter part of the year to prepare a plan of sewerage and sewage disposal for the town. This plan was nearly completed at the end of the year. Litigation was instituted during the summer by an individual against one of the woolen mills in the town. The Department carried on certain experimental work relative to the treatment of wastes from the woolen mills in the town, but it is to be assumed that the sewerage plan now being completed will be designed to remove the industrial wastes which were in part the cause of the complaints.

The attention of the Department also has been called to the pollution of the river in Wellesley, Needham and Newton, and a communication was sent to the Metropolitan District Commission relative to these complaints under date of October 14, 1936, in which the Department recommended the adoption and enforcement of rules and regulations by the Metropolitan District Commission under the provisions of Section 39 of Chapter 92 of the General Laws. The Department offer ed to take such steps as are necessary under the provisions of Section 175 of Chapter 111 of the General Laws upon request of the Metropolitan District Commission. No such request had been made by the end of the year.

Concord and Sudbury Rivers

Examinations have shown a slight improvement in Bannister Brook, one of the tributaries of the Sudbury River, due evidently to the effect of the new Natick sewage treatment plant. Reference is made elsewhere in this report to this plant and also to the new works under construction by the town of Framingham, the effluent from which is to be conveyed downstream to a point of discharge into Bannister Brook near its confluence with the Sudbury River. The analyses show some evidence of an increase in pollution in the Sudbury River below Saxonville.

No particular change has been noted in the condition of the Assabet River nor of the Concord River which receives the discharge from both the Sudbury and Assabet rivers. Recommendations made by the Department during the year 1935 relative

to the treatment of the wastes from the carpet mills in Saxonville have not yet been carried out, but it is to be assumed that these wastes will be removed in the Framingham sewerage system when the new treatment works are completed. The question of the discharge of wastes from a tannery in Lowell into the Concord River was considered by the Department last winter, and under date of January 22, 1936, the Department recommended that suitable outdoor settling tanks be constructed at the plant in question for settling all wastes before discharge into the city sewers; also that suitable sludge beds be provided for the proper disposal of the sludge.

Connecticut River

A resolve was again presented to the Legislature of 1936 relative to an investigation of the pollution of the Connecticut River but it was not passed. The analyses of samples from the Mill River at its mouth below Northampton and the Manhan River at its mouth below Easthampton show an increase in pollution over 1935. These analyses also indicate a slight increase in the pollution of the Connecticut River above Holyoke, but otherwise very little change in the character of the river is to be noted from these analyses. The Department in a communication dated April 13, 1936, recommended the reconstruction of the existing sewage treatment works at Amherst, and under date of November 3, 1936, the Department considered the discharge of the sewage of Easthampton into the Connecticut River through a submerged outlet after preliminary treatment. Favorable consideration was being given in the latter part of the year to conveying the sewage from the town of Amherst in a westerly direction where after preliminary treatment it would be discharged into the Connecticut River through an existing sewer. In response to requests for advice the Department recommended against bathing in the Connecticut River at Hadley and Holyoke because of the condition of the river.

French River

In August 1936 the State Department of Health of Connecticut notified the Department that complaint had been made relative to the offensive condition of the French River, and a special examination was made by this Division with the assistance of the Connecticut Department of Health. At the time of this examination the river was in a deplorable condition due to the sewage discharged into it from the towns of Webster and Dudley.

The Massachusetts Department of Public Health, in accordance with the advice of this Division, approved in 1925 a plan for the collection and disposal of sewage from the towns of Webster and Dudley, but this plan has not been carried out. Officials of the town of Webster recognize that the sewage of that municipality seriously pollutes the stream but the town has felt that it has not been financially able to build works to prevent the pollution. These two municipalities have not grown as rapidly as was expected in 1925, and it is now felt that a sewerage system of somewhat less capacity than that recommended in 1925 will be sufficient. In view of the possibility of obtaining Federal funds to assist in constructing sewerage works, it is recommended that these two municipalities take suitable action in the removal of sewage from the French River during 1937. The results of the analyses of samples collected below Dudley and Webster show an increase in pollution of the river over 1935.

Hoosick River

The Department was directed under the provisions of Chapter 49 of the Resolves of 1936 to co-operate with the Works Progress Administration in an investigation of the sanitary condition of the Hoosick River, and the results of this investigation have been reported to the Legislature in Senate Document No. 50 of 1937. The results of the analyses of the samples collected during this investigation show an increase in the pollution of the South Branch of the river as it passes through the town of Adams. Complaint was made by the health authorities of North Adams to the Department relative to the pollution of the South Branch of the river by sewage from the town of Adams during the year and the Department under date of November 4, 1936, recommended the construction of sewage treatment works in this town.

Under date of December 24, 1936, the Department having been informed that a septic tank had been constructed by the town of Williamstown called the attention of the officials of that town to the necessity under the General Laws of submitting plans to the Department for its advice.

The discharge of sewage from Adams creates seriously objectionable conditions. A plan of sewage disposal for this town was approved by the Department many years ago, and in view of the complaints it is very desirable that the town of Adams take immediate action toward the installation of the necessary treatment works.

Housatonic River

The results of the Department's investigations in co-operation with the Works Progress Administration under the provisions of Chapter 49 of the Resolves of 1936 having to do with the Housatonic River have been submitted to the Legislature and printed in Senate Document No. 50 of 1937. The results of the analyses show somewhat more pollution below Pittsfield than in recent years, and there has been no material improvement during the past year in the condition of the river farther downstream. A settling tank has been constructed at a tannery in Pittsfield in accordance with the recommendations of the Department, and the wastes which were formerly discharged into the river are now discharged into the city sewerage system after sedimentation. Sites have been selected by the Works Progress Administration engineers and plans prepared for sewerage systems and sewage disposal works at Hinsdale and Dalton. The Hinsdale plans were referred to by the Department in a communication dated December 10, 1935, in which intercepting sewers and plain sedimentation tanks with chlorination of the effluent during the driest season were recommended. Experiments have been made by the Department relative to treating the industrial wastes at Dalton in combination with domestic sewage.

The river is used as an intercepting sewer, particularly in the towns of Lee and Great Barrington, and any program to improve the condition of this stream should provide for intercepting sewers and sewage disposal works in these two municipalities. The Department under date of December 15, 1936, recommended certain improvements relative to the disposal works of the town of Stockbridge, and in answer to these recommendations the Department has been advised that the town feels that no further expenditures should be made for the construction of new sewage treatment works until the sewage from other towns in the valley is removed from the river. The question of the treatment of sewage from Pittsfield at new works is referred to elsewhere in this report.

Ipswich River

A complaint was made during the summer of the pollution of one of the tributaries of the Ipswich River in Wilmington, and an investigation showed that the cause of the pollution was the overflow of industrial wastes from a tannery in that town. Under date of July 23, 1936, the Department recommended that this source of pollution be corrected.

Merrimack River

The Merrimack River Valley Sewerage District, created under the provisions of Chapter 446 of the Acts of 1935, was continued under the provisions of Chapter 420 of the Acts of 1936 and the five members of the Board have been appointed. The 1936 act provides that this act shall cease to be effective on January 1, 1938, unless prior to that date Federal funds are allocated to cover the cost of constructing trunk sewers, pumping stations and such other sewerage works as may be necessary to suitably treat, dispose of, or divert, the sewage and other pollution originating in any of the cities and towns in this valley. No Federal funds have been provided and this commission has not as yet entered into any construction activities.

The Department under date of March 18, 1936, recommended the extension of one of the sewer outlets in Haverhill, and under date of August 4, 1936, approved a plan for an additional sewer outlet in Haverhill with the understanding that when the intercepting sewer is constructed provision will be made for the removal of the

dry weather flow. The city of Haverhill has also been concerned during the year with the construction of a retaining wall along the bank of the river which will entail certain sewerage improvements, but the plan for these improvements has not as yet been submitted to the Department.

The usual examinations of the Merrimack River have been made by the Department as required under the provisions of Chapter 202 of the Acts of 1929, and the results of the analyses in general show a slight increase in pollution in parts of the course of the stream. In response to a request from the Chamber of Commerce in Haverhill the Department under date of September 3, 1936, sent a communication to that organization stating that the oxygen in the Merrimack River below Haverhill had been depleted to such an extent that when samples were collected on August 21, 1936, the dissolved oxygen present was hardly enough to sustain fish life. The Department expressed the opinion that the lack of oxygen or polluted matter in the stream might have caused considerable numbers of fish to die.

Millers River

This stream has been under investigation by a Works Progress Administration project investigation during the past year but the work had not been completed at the end of the year.

Nashua River

The Works Progress Administration investigation of the Nashua River referred to in the last annual report of this Division has been continued throughout much of the year, and in accordance with the provisions of Chapter 49 of the Resolves of 1936 the Department has co-operated in this investigation. The report of this Division relative to this investigation has been prepared in Senate Document No. 50 of 1937, and the results of the Works Progress Administration investigation have been published by that organization and copies of the report have been sent to the members of the Legislature from the municipalities in this valley. Copies of this latter report are available for distribution in the office of the Engineering Division of the Department. The Nashua River continues to be seriously polluted by sewage from the city of Leominster and the town of Clinton and by industrial wastes particularly from Fitchburg, Leominster and Clinton. Under date of January 27, 1936, the Department recommended that the Leominster sewerage system be extended to a section of the town of Lunenburg where the discharge of sewage into Whalom Lake had made bathing objectionable. This recommendation has been carried out.

Considerable progress has been made at Leominster in connection with the construction of a new activated sludge plant for the treatment of the Leominster sewage and during the latter part of the year the sewage was passed through a portion of the plant before discharge into the river. Under the court order in the case of Lancaster vs. Leominster the new treatment plant must be in operation before February 1, 1938, and it is expected that the plant will be completed before the latter part of the coming year. In view of the serious pollution of the river by sewage from this municipality it is desirable that as portions of the plant are completed they be put into immediate operation so far as it is practicable to do so. The recommendations of the Department contained in Senate Document No. 50 of 1937, if adopted by the Legislature, should be of value in preventing the further pollution of the Nashua River.

Neponset River

In April, 1935, individuals interested in fishing in the Neponset River complained to this Department relative to the pollution of the stream. The Department recommended to the complainants that a conference be held in the matter but those interested in the question have not replied to this suggestion. A preliminary investigation of this stream has been started by the Works Progress Administration State Planning Project during the past year but the investigation has not been completed.

North River (Salem and Peabody)

No progress appears to have been made during the past year in preventing pollution of this most seriously polluted stream, but the channels of the tributaries of the stream in and above Peabody have been improved under a Federal Works Progress Administration project. During the past year the river was again in the most objectionable condition ever shown by analyses available to this Division.

Quinebaug River

The Quinebaug River below Southbridge has been discolored at the time of the several examinations by this Division due evidently to the discharge of coloring matter from the mills in Southbridge, but the results of analyses of samples collected during these examinations show no marked change in the condition of the river. Complaints have been made to the Department during the past year by officials of the state of Connecticut relative to the pollution of streams entering that state from Massachusetts including the Quinebaug River. The Department has recommended the preparation of a plan for the construction of modern sewage disposal works at Southbridge, and in connection with such a plan consideration should be given to the removal of the industrial wastes which are now discharged into the stream.

Taunton River

Complaint has been made during the year relative to the pollution of the Rumford River, a tributary to the Three Mile River which in turn is a tributary of the Taunton River, and as a result of this complaint the Department under date of September 9, 1936, recommended the treatment of wastes from certain industrial concerns and the construction of a sewerage system in the town of Mansfield. A sewerage system is badly needed in the thickly settled parts of this town to prevent the pollution of the river and improve sanitary conditions, and a plan for such a system with disposal works was approved by the Department on October 9, 1935. Considerable progress has been made during the year in the construction of sewage disposal works at Foxborough.

A complaint was made to the Department during the year relative to the pollution of the Taunton River by industrial wastes discharged into this stream just below the confluence of the Matfield and the Town rivers and after investigation the Department recommended under date of September 15, 1936, to the industrial concern responsible for the condition that a plan for treatment works be submitted to the Department. This matter was under investigation at the end of the year both by the Lawrence Experiment Station of this Division and by the engineers retained by the company. Additional sewerage and sewage disposal works have been constructed at the State Farm in Bridgewater with Federal assistance and pollution of the river by this institution has been prevented. The sewage of the towns of Bridgewater and Middleborough is still discharged into a branch of the Taunton River without treatment. Sewage treatment works are needed in both of these municipalities.

The results of the analyses of samples of the Taunton River and its branches have shown no particular change in condition during the past year and the main river is still seriously polluted by sewage discharged from the city of Taunton below which objectionable conditions have been found at the time of every examination during 1936. The construction of the sewer and pumping station in the valley of the Mill River by which the sewage from this valley is pumped into the main system of the city of Taunton has effected an improvement in the condition of this stream, but until treatment works as recommended by the Department in a communication dated July 13, 1933, have been constructed, objectionable conditions in the Taunton River below the city are likely to continue.

Ten Mile River

The Ten Mile River below North Attleborough and Attleboro has been found by analyses to be more polluted during the past two years than during any year since 1927.

Municipal Sewage Treatment Works

In accordance with the duties of the Department under Section 5 of Chapter 111 of the General Laws this Division has examined all of the sewage treatment works in the State during the past year and in connection with these examinations has caused samples of the raw, settled and filtered sewage to be analyzed. The analyses made in connection with the operation of these works now include determinations of Biochemical Oxygen Demand.

Attleboro

These sewage disposal works were operated in about the usual manner, the sewage being discharged directly onto the filter beds and not being as well distributed over the beds as it should be for efficient operation. The results of the analyses show that the raw sewage reaching these works was somewhat weaker as represented by the albuminoid ammonia content than during the year 1935, but the amount of suspended solids was very high and shows the need of sedimentation. The Department again recommends that steps be taken in preparing plans for preliminary treatment of the sewage before it is discharged to the filter beds.

Barnstable

The new treatment works for the village of Hyannis were completed this year, and construction of the sewerage system serving the thickly settled portion of the village was practically finished. The system should be completed and the treatment works in operation well in advance of the summer season.

Brockton

These works have been continued under the expert direction of a supervising chemist. The results of the analyses show that the sewage during 1936 was weaker than it had been since 1933 and there has been an increase in nitrification in the secondary tank effluent and that of the secondary sand filter beds. The results of the effluents from the other sand filters, however, have not been as satisfactory as usual.

Clinton

The strength of the sewage reaching the Clinton sewage treatment works, which are located in the town of Lancaster, was as in 1935 less than during the previous year, the amount of albuminoid ammonia being the lowest on record in this Department. The effluent from this plant, as in 1935, has improved during the past year. However, much of the sewage collected in the Clinton sewerage system has been allowed to overflow from the pumping station without treatment while during portions of the year it is pumped through the settling basins and then allowed to overflow without filtration. Under date of July 31, 1935, the Department recommended that modern sewage treatment works be constructed for the disposal of the sewage of this municipality.

Concord

The results of the analyses show that the sewage received at these works during the year 1936 was similar in quality to that received at these works in past years and the quality of the effluent from these beds showed a slight improvement. The additional area of 1.93 acres constructed during 1934 and 1935 was completed and put into use during this year.

Easthampton

The strength of the sewage treated in connection with the town of Easthampton during the year 1936 was somewhat less than in the year 1935 and the effluent discharged from the filter beds into the Manhan River was considerably better.

In October, 1936, the town engineer of Easthampton requested the advice of the Department relative to the disposal of sewage from that town. Only a portion of the sewage is now treated and the Department, after an investigation, recommended that the matter of sewerage and sewage disposal be carefully investigated with a view to collecting all of the sewage of the town for partial treatment at suitable works to be located at a point below the town where the treated sewage may be

discharged through a submerged outlet into the Connecticut River. The Department also expressed the opinion that screening and sedimentation and possibly chlorination would be practicable. It was felt that the present treatment works could not be expanded in a manner which will permit the treatment of all the sewage except at considerable cost.

Fitchburg

The operation of these works has been continued under expert supervision and the results of the analyses available to this Department show that the effluent discharged into the North Branch of the Nashua River from these works has been similar in quality to that in past years and has been well nitrified and reasonably stable. The work of reconstruction of the Imhoff tanks, begun during 1935, was still in progress at the end of this year. This construction has greatly increased the work of operating this plant efficiently.

Framingham

At Framingham a considerable quantity of sewage has been allowed to overflow without treatment. After many conferences with the Board of Public Works of the town, the construction of new modern sewage treatment works consisting of Imhoff tanks and trickling filters was started with Federal assistance during the middle of the year. This work has been progressing rather slowly but it is to be assumed that the new works will be in operation next year.

Franklin

The sewage of the town of Franklin continues to be disposed of at two treatment areas, most of the sewage being diverted to the Mine Brook filter beds near Unionville and the balance to the old area in the valley of Timnah Brook. It is again recommended that the old sewage disposal plant be abandoned and the Mine Brook area enlarged to care for the sewage of the entire town. The results of the analyses show that the sewage received at the Mine Brook area was considerably weaker than during the year 1935.

Gardner

There is no particular change in the conditions of the two sewage treatment works of this city. The results of the analyses show that the sewage reaching these plants and the effluent discharged from them was similar in quality to that of previous years. The work started during 1935 in extending the Templeton area was discontinued and nothing was done during the year 1936. As previously recommended, this area should be increased and suitable measuring devices should be installed at the Templeton plant.

Hopedale

These works, as in previous years, have been efficiently operated. The results of the analyses of samples of the sewage and effluent show that the sewage reaching this plant was somewhat weaker than during the year 1935 but the effluent has shown a steady decrease in nitrification over a period of years, the nitrification in 1936 being the lowest since the year 1915.

Hudson

Conditions at the sewage treatment plant of this town have changed but little during the past year. As previously recommended, the sewage should be screened more thoroughly at the pumping station and the present treatment works enlarged at no far distant time in the future if overdosing of the sewage filters is to be prevented. The results of the analyses of samples of sewage and effluent show that the sewage reaching this plant was somewhat weaker during the year 1936 than during the year 1935, and the sewage effluent discharged into the Assabet River showed a greater degree of purification than in 1935.

Leicester

The results of the analyses show that the sewage effluent at the sewage disposal works of this town continues to be of unsatisfactory quality. The sewage reaching

this plant was similar in strength to that of previous years but the quality of the effluent shows continued deterioration, as pointed out in the annual report for 1935. Additional sewage disposal works approved several years ago should be constructed, if overflow of sewage into the French River is to be prevented.

Leominster

Construction of the new sewage treatment works of the city of Leominster was continued during the year 1936, and a considerable portion of these works was completed. At the end of the year all of the sewage of the city was being discharged through the grit chamber. It is probable that the preliminary settling tanks will be available for use late in the spring and the entire plant ready for operation by the fall of 1937.

Marion

The results of the analyses show that the sewage received at these works was somewhat weaker than for several years but the effluent from this plant was less satisfactory. As previously stated, these works are being operated at too high a rate for efficient results and an additional area should be provided at an early date.

Marlborough

The sewage treatment works have been operated in the usual efficient manner and, although the results of the analyses show that the sewage reaching the treatment works during the year 1936 was considerably stronger than during the year 1935, the effluent was satisfactory.

Maynard

During the year 1936 the town of Maynard took over the operation of the sewage disposal works of the American Woolen Company. The town proposes, however, to abandon these disposal works after connection has been made with the municipal sewerage system which will require the laying of a pipe line. The results of the analyses of the sewage reaching the municipal sewage disposal works show that the sewage, as in the past, had been reasonably well purified and the effluent discharged continues to be very satisfactory.

Milford

The new works consisting of additional Imhoff tanks, a trickling filter with an area of 0.47 of an acre, and secondary tanks, were completed during the year and put into operation in November. The construction of these works required the discharge of sewage into the river without treatment at times and the portion of the year during which the new works were in operation was not adequate to determine their efficiency. Late in the year the Department commenced an investigation of the effect on the trickling filters of certain industrial wastes discharged into the sewerage system.

Nantucket

Complaint was made during the height of the summer season relative to offensive odors at the sewage pumping station and also at the sewage disposal works, and in response thereto extensive investigations were made under the direction of representatives of the Division; the pumping station was thoroughly cleaned and the sewage treated with seven to eight parts per million of chlorine so as to prevent the escape of offensive odors. The Department recommended to the Board of Sewer Commissioners of Nantucket under date of September 8, 1936, that provision be made for the completion of an additional four acres of sand filters before May 1, 1937. A recommendation under date of September 10, 1936, was made to the Nantucket Gas and Electric Company relative to the prevention of the escape of tar into the sewerage system.

Natick

The new sewage disposal works completed at Natick in 1935 have not functioned as well as might be expected because of difficulties in the operation of the Imhoff

tanks where septic action occurred. In order to improve conditions digested sludge from the Framingham Imhoff tanks was added to the sludge digestion compartment of one of the tanks and the sludge has been treated with lime. At the end of the year the efficiency of the works showed some improvement.

North Attleborough

As recommended in previous reports, the sewage treatment works of the town of North Attleborough require further enlargements if the sewage is to be adequately treated and pollution of the Ten Mile River prevented. The results of the analyses show that the effluent discharged from these works remains about the same as a year ago and may be considered fairly satisfactory for the quantities of sewage reaching the works.

Northbridge

In the last two annual reports it was recommended that a measuring device be installed at Northbridge in order that more adequate information could be obtained of the quantity of sewage. Judging from the meagre information available the filters are now operated at a rate of at least 70,000 gallons per acre per day. These sewage treatment works have been operated efficiently for a number of years, but the population of the town has increased considerably and likewise there is reason to believe that the quantity of sewage is increasing, especially with the extension of the system. Under the circumstances an addition to the disposal works should be provided and it is probably desirable that the settling tanks and the dosing tanks be reconstructed so as to give somewhat better results.

North Adams

At North Adams mechanical difficulties have been encountered in the operation of the treatment plant and a considerable quantity of sewage was allowed to overflow into the river without treatment. Considerable difficulty was also experienced in the proper digestion of the sludge and changes were made in methods of drawing sludge from the digestion tanks, which involved various changes in the piping at this plant. At the end of the year the operation of the plant was turned over to the regular local operator who had previously acted as an assistant.

Pittsfield

The contract awarded late in 1935 for the new trickling filters was suspended in October but a new contract has been awarded which requires that the additional works be completed on July 1, 1937. Two comminutors have been installed at the pumping station and the old hand-raked screens have been removed. Much sewage has been allowed to overflow from the pumping station during the spring and early summer. The present treatment works are badly crowded.

Southbridge

The matter of the pollution of streams entering the state of Connecticut from the state of Massachusetts has been called to the attention of this Department by officials of the state of Connecticut and in a communication to the Board of Sewer Commissioners of Southbridge dated December 15, 1936, the Department recommended, partly in view of the excessive cost of the proper maintenance of the sand filters of the town, that consideration be given to the construction of more modern sewage treatment works. The work done under Federal assistance in the rehabilitation of the sand filters has not proved to be the proper solution for taking care of all of the sewage of the town at all times and the final effluent at times has not been well purified.

Spencer

The additional sand filter beds constructed in 1935 under Federal assistance have shown reasonably satisfactory results during the year but a considerable quantity of sewage is allowed to overflow into the Seven Mile River from the overflow bed constructed several years ago. In the approval of the additional works the Department recommended in a communication dated March 18, 1935, that as funds become available a settling tank be provided to remove solid matters

from the sewage and that a dosing tank be provided so that the sewage may be more thoroughly distributed over the whole area of filter beds in use each day. The Department also recommended that the question of the discharge of surface and ground water into the sewerage system be investigated. In view of the excessive quantity of sewage discharged during wet weather and at times of storm, it is important that this latter recommendation be carried out as early as practicable. The results of the analyses show that the average effluent discharged from these works was considerably better than that in recent years.

Stockbridge

Inspections of the sewage disposal works at Stockbridge during the past year have shown that from time to time the quantity of sewage exceeds their safe capacity. Additional works were recommended in 1922 and under date of December 15, 1936, the Department recommended the reconstruction of the westerly filter and the construction of additional sand filters having a total area of about one acre. The Department also recommended that less water be used in flushing out the dosing tank and that an investigation be made relative to the possibility of reducing the quantity of water discharged from the automatic flush tanks on the sewerage system. As is desirable at several other municipal sewage filtration plants, a counter should be installed on the dosing tank in order that a record of the quantity of sewage treated may be obtained. The results of the analyses show that the sewage reaching these treatment works was not as strong as during the years 1934 and 1935. The effluent was satisfactory.

Westborough

As during the year 1935, the sewage disposal works at Westborough were operated in a reasonably satisfactory manner and the results of the analyses show that the effluent discharged from these works into the Assabet River remains of good quality.

Winchendon

The sewage disposal works of the town of Winchendon have been well operated during the year 1936 and the results of the analyses show the effluent to be of satisfactory quality. The Department repeats its recommendations that a measuring device be installed to ascertain the amount of sewage treated at these works.

Worcester

At Worcester some difficulty was experienced late in the year because of flooding the beds for the purpose of eliminating a fly nuisance and for a period the results were not as satisfactory as usual. The sewage of this city has been satisfactorily treated during the greater part of the year. The flood of March, 1936, necessitated discharging a large amount of untreated sewage into the Blackstone River and caused considerable damage to the secondary tanks and the effluent trench.

The results of the analyses of the samples collected at the various treatment works show that due to the flood of March, 1936, and other heavy precipitation during the year the sewage reaching the works was in most instances more dilute than that reaching the works during the year 1935.

Results of Analyses and Records of Operation

The results of the Department's analyses and records of operation of the major municipal sewage treatment works in this State are given in the following tables.

An examination of the B.O.D. determinations shows that in general about 90 to 95 per cent removal has been obtained from sand filter plants and 85 to 90 per cent from trickling filter plants. The poorer results obtained from the intermittent sand filters at Leicester, Milford and Pittsfield are caused by overloading the beds and the generally poor condition of the plants. The Milford sand filter beds have been replaced by trickling filters. The B.O.D. in the effluent from the sand filters at Marion, Clinton, Spencer and North Attleborough is much lower than might be expected under conditions existing at those plants.

The analyses represent conditions only at the time samples were collected and do not take into account the bypassing of sewage from certain plants.

TABLE No. 1.—*Average Results of the Analyses of Samples of Sewage as Received at Disposal Works where Rather Complete Treatment is Provided*

(Parts per Million)

City or Town	Residue on Evaporation						Ammonia				Kjeldahl Nitrogen	Chlorides	Alkalinity	Iron		Fats	Oxygen Consumed	B. O. D.
	Total Residue			Loss on Ignition				Albuminoid										
	Total	Dissolved	Suspended	Total	Dissolved	Suspended	Free	Total	Dissolved	Suspended				Total	Dissolved			
Attleboro	437	295	142	223	115	108	40.5	7.06	3.71	3.35	14.6	35	148	1.9	.73	–	60	185
Brockton	543	428	115	247	149	98	52.7	8.88	5.18	3.70	20.7	68	207	1.4	.64	82	120	181
Clinton	662	420	242	433	229	204	31.8	7.83	5.15	2.68	17.4	50	152	3.1	1.5	140	129	160
Concord	247	204	43	108	72	36	18.6	3.71	2.11	1.60	8.4	25	88	1.1	.39	–	39	142
Easthampton	431	318	113	238	141	97	48.3	6.57	3.90	2.67	13.1	41	180	.9	.31	–	73	188
Fitchburg	310	256	54	146	111	35	21.2	3.45	2.36	1.09	8.2	27	107	3.5	1.5	43	45	120
Framingham[1]	850	508	342	480	259	221	47.2	11.70	8.00	3.70	23.4	62	255	2.1	.72	106	92	225
Framingham[2]	695	538	157	405	289	116	31.9	11.61	8.55	3.06	25.5	56	187	2.2	.63	100	101	304
Franklin	582	376	206	352	179	173	53.6	8.05	5.29	2.76	17.0	37	181	1.3	.53	–	76	237
Gardner (Gardner Area)	765	473	292	466	222	244	61.5	15.80	10.30	5.50	28.0	59	247	2.1	.52	159	145	343
Gardner (Templeton Area)	564	367	197	334	165	169	70.0	11.74	7.77	3.97	23.9	52	258	1.7	.64	92	93	233
Hopedale	476	308	168	271	124	147	38.1	5.48	3.95	1.53	13.4	43	150	1.4	.45	63	67	148
Hudson	589	409	180	340	199	141	64.4	10.18	6.25	3.93	22.6	58	237	1.8	.43	130	94	318
Leicester	313	259	54	156	111	45	29.8	5.23	3.82	1.41	11.5	24	121	.9	.33	–	45	118
Marion	205	180	25	94	70	24	15.9	3.10	1.84	1.26	7.7	30	73	1.2	.63	–	52	98
Marlborough	751	503	248	461	257	204	48.3	12.60	8.65	3.95	24.5	50	218	2.1	.57	107	103	287
Maynard	882	491	391	568	220	348	75.7	15.27	8.67	6.60	33.2	64	251	2.4	.58	–	117	463
Milford	698	514	184	411	258	153	44.3	7.90	5.44	2.46	17.5	56	194	1.3	.45	–	93	256
Natick	565	351	214	320	140	180	44.2	7.24	4.04	3.20	16.3	48	193	1.2	.33	81	74	166
North Adams	419	309	110	227	148	79	24.7	5.26	3.60	1.66	11.5	27	154	.9	.26	–	49	158
North Attleborough	1,077	209	868	932	92	840	14.9	5.39	2.64	2.75	15.3	24	75	1.3	.40	–	68	76
Northbridge	404	283	121	233	128	105	37.5	7.08	4.38	2.70	16.1	30	141	1.5	.44	–	66	182
Pittsfield	432	331	101	227	151	76	28.9	5.47	3.30	2.17	11.6	30	184	2.0	.44	45	55	194
Southbridge	624	411	213	379	204	175	70.2	7.85	4.48	3.37	17.5	44	168	1.5	.53	123	89	275
Spencer	339	247	92	195	118	77	19.4	5.80	3.40	2.40	12.6	27	103	1.5	.43	58	63	168
Stockbridge	225	204	21	118	103	15	16.8	2.62	1.80	.82	4.7	14	142	.5	.35	–	33	117
Westborough	476	314	162	275	146	129	40.7	7.95	4.75	3.20	17.3	40	173	1.5	.47	93	72	118
Winchendon	443	318	125	251	161	90	40.1	10.64	5.49	5.15	21.4	33	165	2.8	1.2	–	76	285
Worcester	786	521	265	314	183	131	20.4	7.22	3.24	3.98	19.2	98	142	21.	3.5	85	101	193

[1] Entrance to Imhoff tanks.
[2] At pumping Station.

TABLE NO. 2.—*Average Results of the Analyses of Samples of Sewage as Applied to Filter Beds after Preliminary Treatment*

(Parts per Million)

City or Town	Form of Preliminary Treatment	Residue on Evaporation: Total Residue: Total	Residue on Evaporation: Total Residue: Dissolved	Residue on Evaporation: Total Residue: Suspended	Residue on Evaporation: Loss on Ignition: Total	Residue on Evaporation: Loss on Ignition: Dissolved	Residue on Evaporation: Loss on Ignition: Suspended	Ammonia: Free	Ammonia: Albuminoid: Total	Ammonia: Albuminoid: Dissolved	Ammonia: Albuminoid: Suspended	Kjeldahl Nitrogen	Chlorides	Alkalinity	Iron: Total	Iron: Dissolved	Fats	Oxygen Consumed	B. O. D.
Attleboro	None	437	295	142	223	115	108	40.5	7.06	3.71	3.35	14.6	35	148	1.8	.73	–	60	185
Brockton	Sedim'n Tanks	435	376	59	182	125	57	51.2	7.45	4.62	2.83	15.9	90	205	1.1	.48	50	92	129
Clinton	Sedim'n Basins	338	316	22	172	154	18	23.5	4.21	3.22	0.99	9.0	40	118	2.8	.57	34	76	73
Concord	None	247	204	43	108	72	36	18.6	3.71	2.11	1.60	8.4	25	88	1.1	.39	–	39	142
Easthampton	Sedim'n Tanks	357	293	64	176	121	55	42.7	8.37	4.30	4.07	11.7	39	183	.9	.29	–	61	140
Fitchburg	Imhoff Tanks	283	243	40	134	107	27	20.3	3.24	2.33	0.91	7.7	29	106	2.2	1.2	45	41	98
Framingham	Imhoff Tanks	513	439	74	254	197	57	46.3	7.80	6.01	1.79	13.7	65	243	1.5	.81	50	57	148
Franklin	Sedim'n Tanks	323	282	41	150	119	31	29.7	3.88	2.40	1.48	8.7	32	135	.9	.43	–	38	180
Gardner (Gardner Area)	None	765	473	292	466	222	244	61.5	15.80	10.30	5.50	28.0	59	247	2.1	.52	159	145	343
Gardner (Templeton Area)	Sedim'n Tanks	446	349	97	244	158	86	43.1	6.21	3.58	2.63	12.5	43	191	1.4	.73	54	60	157
Hopedale	Septic Tanks	363	292	71	195	146	49	46.0	5.80	3.78	2.02	15.8	48	172	2.8	.55	–	66	148
Hudson	Sedim'n Tanks	403	308	95	197	124	73	45.5	4.90	3.26	1.64	11.2	46	198	1.4	.58	59	54	134
Leicester	None	313	259	54	156	111	45	29.8	5.23	3.82	1.41	11.5	24	121	.9	.33	–	45	118
Marion	Sedim'n Tanks	190	171	19	80	64	16	14.1	1.84	1.28	.56	4.0	28	75	1.1	.65	–	25	62
Marlborough	Sedim'n Tanks	510	429	81	259	189	70	48.0	6.83	5.21	1.62	14.6	46	210	1.2	.50	53	56	142
Maynard	Imhoff Tank	395	342	53	172	124	48	52.9	6.08	3.78	2.30	12.1	54	221	1.0	.50	–	48	190
Milford	Sedim'n Tanks	506	414	92	235	162	73	41.2	6.06	4.51	1.55	11.0	52	183	2.1	.46	–	62	186
Milford	Imhoff Tank	822	576	246	355	283	72	59.0	6.88	5.23	1.65	12.1	49	238	1.0	.33	–	60	192
Natick	Imhoff Tank	391	354	37	174	149	25	34.9	3.93	2.70	1.23	8.6	42	177	1.0	.59	42	41	121
North Adams	Sedim'n Tanks	352	306	46	175	138	37	23.5	4.05	2.91	1.14	8.4	27	169	.7	.31	–	38	99
N. Attleborough	Sedim'n Tanks	242	213	29	103	80	23	15.2	2.39	1.46	.93	6.4	22	85	.7	.40	–	28	66
Northbridge	Sedim'n Tanks	241	208	33	113	84	29	29.4	4.30	2.97	1.33	9.8	25	114	1.1	.42	–	40	128
Pittsfield	Sedim'n Tank	354	299	55	176	122	54	25.3	3.75	2.65	1.10	8.6	28	177	1.3	.36	27	43	99
Southbridge	Sedim'n Tanks	425	351	74	225	157	68	45.0	5.68	3.72	1.96	12.9	37	169	1.3	.57	71	67	131
Spencer	None	339	247	92	195	118	77	19.4	5.80	3.40	2.40	12.6	27	103	1.5	.43	58	63	168
Stockbridge	None	225	204	21	118	103	15	16.8	2.62	1.80	.82	4.7	14	142	.5	.35	–	33	117
Westborough	None	476	314	162	275	146	129	40.7	7.95	4.75	3.20	17.3	40	173	1.5	.47	93	72	118
Winchendon	Sedim'n Tanks	284	268	16	126	112	14	25.9	3.79	2.77	1.02	8.3	29	134	2.6	1.5	–	39	108
Worcester	Imhoff Tanks	603	502	101	179	123	56	25.0	3.56	1.96	1.60	8.2	79	125	19.	3.7	34	51	98

TABLE NO. 3.—*Efficiency of Settling Tanks and Other Forms of Preliminary Treatment as Indicated by the Foregoing Tables*

(Parts per Million and Per Cent)

City or Town	Form of Preliminary Treatment	Detention Period (Hours)	Suspended Solids			Total Albuminoid Ammonia			Chlorides		Fats			Oxygen Consumed			B. O. D.		
			Raw Sewage	Settled or treated Sewage	Per Cent Removed	Raw Sewage	Settled or treated Sewage	Per Cent Removed	Raw Sewage	Settled or treated Sewage	Raw Sewage	Settled or treated Sewage	Per Cent Removed	Raw Sewage	Settled or treated Sewage	Per Cent Removed	Raw Sewage	Settled or treated Sewage	Per Cent Removed
Brockton	Sedimentation Tanks	2.3	115	59	49	8.88	7.45	16	68	90	82	50	39	120	92	22	181	129	29
Clinton	Sedimentation Basins	7.5	242	22	91	7.83	4.21	46	50	40	140	34	76	129	76	41	160	73	54
Easthampton	Sedimentation Tanks	–	113	64	43	6.57	8.37	–	41	39	–	–	–	73	61	16	188	140	26
Fitchburg	Imhoff Tanks	4.2	54	40	26	3.45	3.24	6	27	29	43	45	–	45	41	9	120	98	18
Framingham	Imhoff Tanks	–	342	74	78	11.70	7.80	33	62	65	106	50	47	92	57	38	225	148	34
Franklin	Sedimentation Tanks	–	206	41	80	8.05	3.88	52	37	32	–	–	–	76	38	50	237	180	76
Gardner (Templeton Area)	Sedimentation Tanks	–	197	97	51	11.74	6.21	46	52	43	92	54	41	93	60	36	233	157	33
Hopedale	Septic Tanks	8.3	168	71	58	5.48	5.80	–	43	48	63	–	–	67	66	1	148	148	0
Hudson	Sedimentation Tanks	18.5	180	95	47	10.18	4.90	52	58	46	130	59	55	94	54	43	318	134	58
Marion	Sedimentation Tanks	14.2	25	19	76	3.10	1.84	41	30	28	–	–	–	52	25	54	98	62	37
Marlborough	Sedimentation Tanks	6.9	248	81	67	12.60	6.83	46	50	46	107	53	50	103	56	46	287	142	51
Maynard	Imhoff Tank	11.1	391	53	87	15.27	6.08	73	64	54	–	–	–	117	48	59	463	190	59
Milford	Sedimentation Tanks	–	184	92	50	7.90	6.06	23	56	52	–	–	–	93	62	34	256	186	27
Milford	Imhoff Tank	–	184	246	–	7.90	6.88	13	56	49	–	–	–	93	60	–	256	192	25
North Adams	Sedimentation Tanks	2.6	110	46	58	5.26	4.05	23	27	27	–	–	–	49	38	22	158	99	37
N. Attleborough	Sedimentation Tanks	–	868	39	96	5.39	2.39	56	24	22	–	–	–	68	28	59	76	66	13
Natick	Imhoff Tanks	–	214	37	83	7.24	3.93	46	48	42	81	42	48	74	41	45	166	121	27
Northbridge	Sedimentation Tanks	2.4	121	33	73	7.08	4.30	39	30	25	–	–	–	66	40	39	182	128	30
Pittsfield	Sedimentation Tank	–	101	55	46	5.47	3.75	31	30	28	45	27	40	55	43	22	194	99	49
Southbridge	Sedimentation Tanks	–	213	74	65	7.85	5.68	28	44	37	123	71	42	89	67	25	275	131	52
Winchendon	Sedimentation Tanks	–	125	16	87	10.64	3.79	64	33	29	–	–	–	76	39	49	285	108	62
Worcester	Imhoff Tanks	2.7	265	101	62	7.22	3.56	51	98	79	85	34	60	101	51	50	193	98	49

TABLE NO. 4. — *Average Results of the Analyses of Samples of Sewage Applied to the Trickling Filters at Brockton, Fitchburg, Maynard, Milford, Natick and Worcester and Their Effluents, etc., Per Cent Removed, etc.*

(Parts per Million)

Brockton

	Residue on Evaporation						Ammonia						Nitrogen as—					
	Total Residue			Loss on Ignition				Albuminoid										Remarks
	Total	Dissolved	Suspended	Total	Dissolved	Suspended	Free	Total	Dissolved	Suspended	Kjeldahl Nitrogen	Chlorides	Nitrates	Nitrites	Fats	Oxygen Consumed	B. O. D.	
Settled sewage as applied to trickling filter.	435.	376.	59.	182.	125.	57.	51.2	7.45	4.62	2.83	15.9	90.	–	–	50.	92.	129	Trickling filter has an area of 2.0 acres and a depth of 10 feet of stone from 1.5 to 3 inches in size.
Effluent from trickling filter.	443.	382.	61.	158.	105.	53.	25.4	3.73	1.54	2.19	7.7	78.	16.60	.56	15.	53.	20	One half of filter used alternately. The average rate of operation was about 1,323,000 gallons per acre per day.
Per cent removed.	–	–	–	13.	16.	7.	50.	50.	67.	23.	52.	13.	–	–	70.	42.	84	
Settled effluent from trickling filter.	387.	346.	41.	135.	97.	38.	25.7	3.03	1.63	1.40	6.2	78.	18.00	.58	13.	47.	16	
Per cent removed by secondary settling tank.	13.	9.	33.	15.	8.	28.	–	19.	–	36.	19.	0.	–	–	13.	12.	20	Period of sedimentation averaged about 1.7 hours.
Per cent removed by trickling filter and secondary settling tank.	11.	8.	30.	26.	22.	33.	50.	59.	65.	51.	61.	13.	–	–	74.	49.	88	Tanks cleaned 51 times.

TABLE No. 4. — *Average Results of the Analyses of Samples of Sewage Applied to the Trickling Filters of Brockton, Fitchburg, Maynard, Milford, Natick and Worcester and Their Effluents, etc., Per Cent Removed, etc.* — Continued

(Parts per Million)

Fitchburg

	Residue on Evaporation						Ammonia						Nitrogen as—					
	Total Residue			Loss on Ignition				Albuminoid										
	Total	Dissolved	Suspended	Total	Dissolved	Suspended	Free	Total	Dissolved	Suspended	Kjeldahl Nitrogen	Chlorides	Nitrates	Nitrites	Fats	Oxygen Consumed	B. O. D.	Remarks
Imhoff tank effluent as applied to trickling filter	283.	243.	40.	134.	107.	27.	20.3	3.24	2.33	.91	7.7	29.	–	–	45.	41.	98	Trickling filter has an area of 2.14 acres and a depth of 10 feet of stone from 1 to 3 inches in size.
Effluent from trickling filter.	281.	237.	44.	127.	98.	29.	4.7	2.18	1.11	1.07	4.6	27.	13.37	.43	–	26.	19	The average rate of operation was about 1,850,000 gallons per acre per day for area used (1.86).
Per cent removed.	1.	2.	–	5.	8.	–	77.	33.	52.	–	40.	7.	–	–	–	37.	80	
Settled effluent from trickling filter as discharged to Nashua River.	249.	223.	26.	108.	91.	17.	4.9	1.57	.86	.71	3.5	27.	12.77	.49	–	20.	14	
Per cent removed by secondary settling tanks.	11.	6.	41.	15.	7.	41.	–	28.	23.	34.	24.	0.	–	–	–	23.	26	Period of sedimentation about 2 hours.
Per cent removed by trickling filter and secondary settling tanks.	12.	8.	35.	19.	15.	37.	75.	52.	63.	22.	55.	7.	–	–	–	51.	86	Tanks cleaned 26 times.

Maynard

Imhoff tank effluent as applied to trickling filter.	395.	342.	53.	172.	124.	48.	52.9	6.08	3.78	2.30	12.1	54.	–	–	–	48.	190	Trickling filter has an area of .25 of an acre and a depth of 7 feet of stone from 1½ to 2½ inches in size.
Effluent from trickling filter.	375.	335.	40.	138.	107.	31.	23.7	2.77	1.71	1.06	4.8	56.	16.27	.60	–	25.	23	The average rate of operation was about 396,000 gallons per acre per day.
Per cent removed.	5.	2.	25.	20.	14.	35.	55.	55.	55.	54.	60.	–	–	–	–	48.	88	
Settled effluent from trickling filter as discharged to Assabet River.	395.	378.	17.	142.	129.	13.	22.7	2.21	1.46	.75	4.2	58.	16.65	.63	–	23.1	20	
Per cent removed by secondary settling tank.	–	–	58.	–	–	58.	4.	20.	15.	27.	13.	–	–	–	–	8.	14	Period of sedimentation about 7.9 hours.
Per cent removed by trickling filter and secondary settling tank.	0.	–	68.	17.	–	73.	57.	64.	61.	67.	65.	–	–	–	–	52.	90	Tanks cleaned 20 times.

Milford

Imhoff tank effluent as applied to trickling filter.	822.	576.	246.	355.	283.	72.	59.0	6.88	5.23	1.65	12.1	49.	2.04	.00	–	60.	192	Old trickling filter has an area of .28 of an acre and a depth of 6 feet of stone from 1 to 1¾ inches in size.
Effluent from trickling filter.	359.	305.	54.	117.	72.	45.	20.6	2.53	1.35	1.18	5.2	50.	7.54	.30	–	41.	32	
Per cent removed.	56.	47.	78.	65.	75.	38.	48.	63.	74.	29.	57.	–	–	–	–	–	83	New trickling filter has an area of .47 of an acre and a depth of 6 feet of stone from ¾ to 1½ inches in size.
Settled effluent from trickling filter as discharged to Charles River.	410.	310.	100.	95.	65.	30.	16.4	1.45	.84	.61	3.2	52.	8.92	.54	–	24.	15	
Per cent removed by secondary settling tank.	–	–	–	19.	10.	33.	20.	43.	38.	48.	38.	–	–	–	–	40.	53	
Per cent removed by trickling filter and secondary settling tank.	50.	46.	59.	73.	77.	58.	72.	79.	84.	63.	74.	–	–	–	–	80.	92	

TABLE NO. 4. — *Average Results of the Analyses of Samples of Sewage Applied to the Trickling Filters of Brockton, Fitchburg, Maynard, Milford, Natick and Worcester and Their Effluents, etc., Per Cent Removed, etc.* — Concluded

(Parts per Million)

Natick

Imhoff tank effluent as applied to trickling filter.	391.	354.	37.	174.	149.	25.	34.9	3.93	2.70	1.23	8.6	42.	–	–	42.	41.	121	Trickling filter has an area of .2 and a depth of 8 feet of stone from 1 to 2 inches in size. The average rate of operation was about 1,120,000 gallons per acre per day.
Effluent from trickling filter.	384.	335.	49.	147.	117.	30.	14.1	2.27	1.41	.86	4.7	41.	11.35	.74	–	24.	20	
Per cent removed.	2.	5.	–	16.	21.	–	60.	42.	48.	30.	45.	2.	–	–	–	43.	83	
Settled effluent from trickling filter as discharged to Bannister Brook.	356.	308.	48.	128.	111.	17.	13.6	1.95	1.12	.83	3.9	42.	12.87	.81	–	22.	22	
Per cent removed by secondary settling tank.	7.	8.	2.	13.	5.	75.	4.	14.	21.	3.	17.	–	–	–	–	7.	–	Period of sedimentation averaged about 3.2 hours.
Per cent removed by trickling filter and secondary settling tank.	9.	13.	–	25.	25.	32.	61.	50.	58.	33.	55.	–	–	–	–	47.	82	Tanks cleaned 3 times.

Worcester

Imhoff tank effluent as applied to trickling filter.	603.	502.	101.	179.	123.	56.	25.	3.56	1.96	1.60	8.2	79.	–	–	34.	51.	98	Trickling filters have an area of 13.68 acres and a depth of 10 feet of stone from 1 to 3 inches in size. The average rate of operation was about 1,680,000 gallons per acre per day.
Effluent from trickling filter.	442.	409.	33.	93.	79.	14.	14.7	1.44	.77	.67	3.7	74.	3.61	.40	18.	22.	31	
Per cent removed.	27.	19.	67.	48.	36.	75.	41.	60.	61.	58.	55.	6.	–	–	47.	57.	68	
Settled effluent from trickling filters as discharged to Blackstone River.	442.	413.	29.	91.	74.	17.	14.3	1.54	.74	80.	3.6	71.	2.58	.41	13.	20.	18	
Per cent removed by secondary settling tanks.	0.	–	12.	2.	6.	–	3.	–	4.	–	3.	4.	–	–	28.	9.	42	Period of sedimentation averaged about 2.1 hours.
Per cent removed by trickling filters and secondary settling tanks.	27.	18.	71.	49.	40.	70.	43.	57.	62.	50.	56.	1.	–	–	62.	61.	82	

TABLE No. 5. — *Average Results of Analyses of Samples of Effluent from Sand Filters*

(Parts per Million)

City or Town	Free Ammonia	Total Albuminoid Ammonia	Kjeldahl Nitrogen	Nitrogen as Nitrates	Nitrogen as Nitrites	Chlorides	Iron	B.O.D.
Attleboro	9.6	1.45	2.8	11.05	.50	30	1.8	15
Brockton	11.9	.84	1.8	12.90	.30	75	2.8	9
Clinton	4.1	.49	1.2	8.67	.11	33	7.2	2
Concord	2.2	.24	0.5	9.00	.03	25	.42	0.5
Easthampton	5.5	.48	0.9	24.45	.18	33	1.2	2
Framingham (new beds)	18.8	1.85	3.5	14.83	.48	71	5.2	10
Framingham (old beds)	19.7	1.56	3.1	5.49	.22	58	6.3	14
Franklin	7.3	.93	2.5	9.70	.27	38	1.4	12
Gardner (Gardner Area)	24.2	2.45	4.1	27.78	.41	64	1.2	26
Gardner (Templeton Area)	24.7	1.68	3.3	13.29	.31	45	4.7	10
Hopedale	14.8	.87	1.9	13.81	.01	31	.36	0.4
Hudson	14.3	1.40	2.8	14.30	.56	40	4.0	18
Leicester	14.1	1.43	2.9	1.00	.17	21	1.1	25
Marion	3.0	.62	0.9	9.17	.14	34	.45	2
Marlborough	10.2	.78	1.6	15.73	.28	42	2.0	7
Milford	35.0	1.60	2.9	1.51	.06	53	6.3	40
North Attleborough	4.5	.42	1.1	4.00	.32	20	2.1	2
Northbridge	5.8	.61	1.2	8.55	.46	23	.42	2
Pittsfield	17.1	1.18	2.5	3.77	.02	26	4.7	25
Southbridge	20.2	.76	1.8	2.62	.13	35	7.8	18
Spencer	9.4	.44	.9	3.23	.13	24	7.9	2
Stockbridge	2.4	.33	.9	9.98	.07	17	.71	3
Westborough	8.9	.92	2.3	8.56	.49	25	1.9	10
Winchendon	7.8	.61	1.7	12.23	.10	29	.72	5

TABLE No. 6. — *Efficiency of Sand Filters (Per Cent of Free and Albuminoid Ammonia Removed)*

(Parts per Million and Per Cent)

City or Town	Free Ammonia			Total Albuminoid Ammonia			Kjeldahl Nitrogen			Chlorides		B. O. D.		
	Applied Sewage	Effluent	Per Cent Removal	Applied Sewage	Effluent	Per Cent Removal	Applied Sewage	Effluent	Per Cent Removal	Applied Sewage	Effluent	Applied Sewage	Effluent	Per Cent Removal
Attleboro	40.5	9.6	76	7.06	1.45	79	14.6	2.8	81	35.	30.	185.	15.	92
Brockton	51.2	11.9	77	7.45	.84	89	15.9	1.8	89	90.	75.	129.	9.	93
Clinton	23.5	4.1	83	4.21	.49	88	9.0	1.2	87	40.	33.	73.	2.	98
Concord	18.6	2.2	88	3.71	.24	93	8.4	0.5	94	25.	25.	142.	0.5	99.6
Easthampton	42.7	5.5	87	8.37	.48	94	11.7	0.9	92	39.	33.	140.	2.	99
Framingham (new beds)	46.3	18.8	59	7.80	1.85	76	13.7	3.5	74	65.	71.	148.	10.	93
Framingham (old beds)	31.9	19.7	38	11.61	1.56	86	25.5	3.1	89	56.	58.	304.	14.	95
Franklin	29.7	7.3	75	3.88	.93	76	8.7	2.5	71	32.	38.	180.	12.	93
Gardner (Gardner Area)	61.5	24.2	61	15.80	2.45	85	28.0	4.1	85	59.	64.	343.	26.	92
Gardner (Templeton Area)	43.1	24.7	36	6.21	1.68	73	12.5	3.3	74	43.	45.	157.	10.	94
Hopedale	46.0	14.8	68	5.80	.87	85	15.8	1.9	88	48.	31.	148.	0.4	99.8
Hudson	45.5	14.3	69	4.90	1.40	71	11.2	2.8	75	46.	40.	134.	18.	86
Leicester	29.8	14.1	53	5.23	1.43	73	11.5	2.9	75	24.	21.	118.	25.	79
Marion	14.1	3.0	79	1.84	.62	66	4.0	0.9	77	28.	34.	62.	2.	97
Marlborough	48.0	10.2	79	6.83	.78	89	14.6	1.6	89	46.	42.	142.	7.	95
Milford	41.2	35.0	15	6.06	1.60	74	11.0	2.9	74	52.	53.	186.	40.	78
No. Attleborough	15.2	4.5	70	2.39	.42	83	6.4	1.1	83	22.	20.	66.	2.	97
Northbridge	29.4	5.8	80	4.30	.61	86	9.8	1.2	88	25.	23.	128.	2.	98
Pittsfield	25.3	17.1	32	3.75	1.18	69	8.6	2.5	71	28.	26.	99.	25.	75
Southbridge	45.0	20.2	55	5.68	.76	87	12.9	1.8	86	37.	35.	131.	18.	86
Spencer	19.4	9.4	52	5.80	.44	92	12.6	0.9	93	27.	24.	168.	2.	99
Stockbridge	16.8	2.4	86	2.62	.33	87	4.7	0.9	81	14.	17.	117.	3.	97
Westborough	40.7	8.9	76	7.95	.92	88	17.3	2.3	87	40.	25.	118.	10.	92
Winchendon	25.9	7.8	70	3.79	.61	84	8.3	1.7	80	29.	29.	108.	5.	95

TABLE No. 7. — *Summary of Efficiency of Sewage Disposal Works.* (*Per Cent Removal from Raw Sewage to Final Effluent*)

(Parts per Million and Per Cent)

City or Town	Suspended Solids			Free Ammonia			Total Albuminoid Ammonia			Kjeldahl Nitrogen			Chlorides		Oxygen Consumed			B.O.D.		
	Raw Sewage	Final Effluent	Per Cent Removal	Raw Sewage	Final Effluent	Per Cent Removal	Raw Sewage	Final Effluent	Per Cent Removal	Raw Sewage	Final Effluent	Per Cent Removal	Raw Sewage	Final Effluent	Raw Sewage	Final Effluent	Per Cent Removal	Raw Sewage	Final Effluent	Per Cent Removal
Attleboro	–	–	–	40.5	9.6	76.	7.06	1.45	79.	14.6	2.8	81.	35.	30.	60.	14.	77.	185.	15.	92.
Brockton	–	–	–	52.7	11.9	77.	8.88	.84	90.	20.7	1.8	91.	68.	75.	120.	14.	88.	181.	9.	95.
Clinton	–	–	–	31.8	4.1	87.	7.83	.49	94.	17.4	1.2	94.	50.	33.	129.	14.	89.	160.	2.	99.
Concord	–	–	–	18.6	2.2	88.	3.71	.24	93.	8.4	0.5	94.	25.	25.	39.	4.0	90.	142.	0.5	99.7
Easthampton	–	–	–	48.3	5.5	89.	6.57	.48	93.	13.1	0.9	93.	41.	33.	73.	8.4	88.	188.	2.	99.
Fitchburg	54.	26.	52.	21.2	4.9	77.	3.45	1.57	55.	8.2	3.5	57.	27.	27.	45.	20.	56.	120.	14.	88.
Framingham (new beds)	–	–	–	47.2	18.8	60.	11.70	1.85	83.	23.4	3.5	85.	62.	71.	92.	19.	79.	225.	10.	95.
Framingham (old beds)	–	–	–	31.9	19.7	39.	11.61	1.56	86.	25.5	3.1	88.	56.	58.	101.	19.	81.	304.	14.	95.
Franklin	–	–	–	53.6	7.3	86.	8.05	.93	88.	17.0	2.5	85.	37.	38.	76.	11.	86.	237.	12.	95.
Gardner (Gardner Area)	–	–	–	61.5	24.2	61.	15.80	2.45	85.	28.0	4.1	85.	59.	64.	145.	21.	86.	343.	26.	92.
Gardner (Templeton Area)	–	–	–	70.0	24.7	65.	11.74	1.68	86.	23.9	3.3	86.	52.	45.	93.	17.8	81.	233.	10.	96.
Hopedale	–	–	–	38.1	14.8	61.	5.48	.87	84.	13.4	1.9	86.	43.	31.	67.	11.7	83.	148.	0.4	99.8
Hudson	–	–	–	64.4	14.3	78.	10.18	1.40	86.	22.6	2.8	88.	58.	40.	94.	16.9	82.	318.	18.	94.
Leicester	–	–	–	29.8	14.1	53.	5.23	1.43	73.	11.5	2.9	75.	24.	21.	45.	13.9	69.	118.	25.	78.
Marion	–	–	–	15.9	3.0	81.	3.10	.62	80.	7.7	0.9	88.	30.	34.	52.	5.8	79.	98.	2.	98.
Marlborough	–	–	–	48.3	10.2	79.	12.60	.78	94.	24.5	1.6	94.	50.	42.	103.	8.8	91.	287.	7.	97.
Maynard	391.	17.	96.	75.7	22.7	70.	15.27	2.21	86.	33.2	4.2	87.	64.	58.	117.	23.1	80.	463.	20.	96.
Milford (sand)	–	–	–	44.3	35.0	21.	7.90	1.60	80.	17.5	2.9	83.	56.	53.	93.	24.	74.	256.	40.	84.
Milford (Imhoff)	184.	100.	46.	44.3	16.4	63.	7.90	1.45	82.	17.5	3.2	82.	56.	52.	93.	24.	74.	256.	15.	94.
Natick (Imhoff)	214.	48.	78.	44.2	13.6	69.	7.24	1.95	73.	16.3	3.9	76.	48.	42.	74.	22.	70.	166.	22.	87.
North Adams	110.	46.	58.	–	–	–	5.26	4.05	23.	11.5	8.4	27.	27.	27.	49.	38.	22.	158.	99.	37.
North Attleborough	–	–	–	14.9	4.5	70.	5.39	.42	92.	15.3	1.1	93.	24.	20.	68.	6.4	91.	76.	2.	97.
Northbridge	–	–	–	37.5	5.8	85.	7.08	.61	91.	16.1	1.2	93.	30.	23.	66.	7.	89.	182.	2.	99.
Pittsfield	–	–	–	28.9	17.1	41.	5.47	1.18	78.	11.6	2.5	78.	30.	26.	55.	13.	76.	194.	25.	87.
Southbridge	–	–	–	70.2	20.2	71.	7.85	.76	90.	17.5	1.8	90.	44.	35.	89.	9.9	89.	275.	18.	93.
Spencer	–	–	–	19.4	9.4	51.	5.80	.44	92.	12.6	0.9	93.	27.	24.	63.	9.3	85.	168.	2.	99.
Stockbridge	–	–	–	16.8	2.4	86.	2.62	.33	87.	4.7	0.9	81.	14.	17.	33.	5.5	83.	117.	3.	97.
Westborough	–	–	–	40.7	8.9	78.	7.95	.92	88.	17.3	2.3	87.	40.	25.	72.	11.8	84.	118.	10.	92.
Winchendon	–	–	–	40.1	7.8	81.	10.64	.61	94.	21.4	1.7	92.	33.	29.	76.	8.5	89.	285.	5.	98.
Worcester	265.	29.	89.	20.4	14.3	30.	7.22	1.54	79.	19.2	3.6	81.	98.	71.	101.	20.	80.	193.	18.	91.

TABLE No. 8. —*Extent of Sewerage Works, Rate of Flow, and Rate of Operation of Filters*

City or Town	Population, Census of 1935	Approximate Length of Sanitary Sewers (Miles)	Approximate Number of House Connections	Estimated Quantity of Sewage Treated (Gallons per Day)			Estimated Quantity of Sewage per Connection	Net Area of Filter Beds (Acres)	Estimated Rate of Operation with Even Distribution (Gallons per Acre per Day)
				Average for Year	Average for Month of Maximum Flow	Average for Month of Minimum Flow			
Attleboro	21,835	37.31	1,871	1,075,000	1,592,000	455,000	574	15.50	69,000
Brockton	62,407	110.01	8,856	3,191,000 [1]	5,121,000	2,159,000	360	37.00	–
Clinton	12,373	25.89	1,937	1,440,000	2,118,000	1,161,000	742	26.23	55,000
Concord	7,723	17.68	763	566,000 [2]	1,075,000	330,000	742	7.41	76,000
Easthampton	10,486	25.96	1,276	–	–	–	–	2.20	–
Fitchburg	41,700	66.72	–	3,505,000	4,210,000	2,410,000	–	–	–
Framingham	22,651	46.65	3,692	1,344,000	2,453,000	877,000	364	28.56	47,000
Franklin	7,494	14.29	867	284,000	515,000	126,000	328	3.24	88,000
Gardner	20,397	38.05	2,593	–	–	–	385	16.50	61,000
Hopedale	3,068	7.08	370	191,000 [3]	402,000	148,000	516	3.79	50,000
Hudson	8,495	14.73	1,165	519,000	909,000	396,000	445	9.00	58,000
Marion	1,867	4.23	245	182,000	323,000	58,000	697	1.53	112,000
Marlborough	15,781	36.87	2,669	1,114,000	2,188,000	779,000	418	20.19	55,000
Maynard	7,107	8.63	451	99,000	119,000	83,000	220	–	–
Milford	15,008	25.57	1,855	750,000 [4]	1,500,000 [4]	500,000 [4]	404	9.30	–
Nantucket	3,495	22.00 [5]	1,637 [5]	716,000	862,000	540,000	437	4.00 [6]	179,000
Natick	14,394	14.23	1,697	793,000	1,822,000	425,000	467	–	–
North Adams	22,085	35.44	4,800	1,946,000	2,620,000	1,590,000	405	–	–
North Attleborough	10,202	17.99	1,074	731,000	808,000	564,000	681	8.75	84,000
Northbridge	10,577	15.98	988	825,000	956,000	700,000	835	12.00	69,000
Pittsfield	47,516	85.52	6,956	4,979,000	5,628,000	4,390,000	716	41.15	121,000
Southbridge	15,786	24.70	1,793	–	–	–	–	10.95	–
Spencer	6,487	10.50	869	727,000	1,144,000	788,000	837	12.30	59,000
Westborough	6,073	9.11	613	361,000	819,000	193,000	589	6.62	55,000
Winchendon	6,603	13.02	459	–	–	–	–	4.00	–
Worcester	190,471	246.60 [7]	–	22,040,000	38,530,000	15,900,000	–	–	–

[1] Includes an average of 2,647,000 gallons per day to trickling filters and 544,000 gallons to sand filters.
[2] Entire quantity of sewage not treated.
[3] New development not included in average.
[4] Quantities approximate only.
[5] Four miles of sewer and 184 connections in addition in Siasconset.
[6] No underdrains. Filters drain direct to ocean.
[7] Includes 70.2 miles of combined sewers.

TABLE No. 9. — *General Features*

City or Town	Year of Construction of and Additions to Works	Depth of Underdrains (Feet)	Distance Apart of Underdrains (Feet)	Filtering Material	Attention given to Disposal Works
Attleboro	1912, 1913	4–7	35	Sand and gravel; found in place	One man all the time; others when necessary.
Brockton	1893, 1905, 1908, 1912	5.5	30	Sand and gravel; found in place; trickling filter.	One chemist in charge, foreman, day and night man; more when necessary.
Clinton	1898, 1899	8	60–70	Sand and gravel; found in place	Two men all the time; others when necessary.
Concord	1899, 1928, 1934	none	–	Sand underlaid with gravel; found in place	One man once a day.
Easthampton	1908	3.5	20–40	Sand and gravel; largely found in place	One man all the time; others when necessary.
Fitchburg	1914	–	–	Trickling filter—10 feet deep	Chemist in charge; 1 foreman, 1 day and 2 night men.
Framingham	1890, 1924, 1933	–	–	Sand and gravel	One man all the time; others when necessary.
Franklin	1915	4.5	26	Sand and gravel	Very little attention; one man once in a while.
Gardner (Gardner Area)	1891	5	20	Sand; handled in construction	One man all the time; others when necessary.
Gardner (Templeton Area)	1901, 1909, 1931	3–4	20–30	Sand; handled in construction	One man all the time; others when necessary.
Hopedale	1900, 1923	3	35–60	Material—sand and gravel	One man all the time; others when necessary.
Hudson	1904, 1910	5–6	50–100	Sand and gravel; found in place	One man all the time; others when necessary.
Leicester	1894, 1928	4	8	Sand; handled in construction	Very little attention.
Marion	1906, 1930	5	–	Sand; largely found in place	One man every day in summer, every other day in winter.
Marlborough	1891, 1908, 1909, 1910, 1911	4.5–6	30–50	Sand; found in place	One man all the time; others when necessary.
Maynard	1929	–	–	Trickling filter, 7 feet deep	One man all the time.
Milford	1907, 1924, 1936	5	40	Sand; found in place; trickling filters	One man every day; others when necessary.
Nantucket	1930	–	–	Sand and gravel; found in place	One man when necessary.
Natick	1896 [1], 1935	–	–	Trickling filters	One man all the time; others when necessary.
North Adams	1935	–	–	Preliminary settling tanks; sludge digestion	Two men all the time.
North Attleborough	1909, 1910, 1931	5–6.5	55	Sand and gravel; found in place	One man every day; others when necessary.
Northbridge	1906, 1907, 1920	4	50–75	Sand and gravel; mostly handled	One man all the time; others when necessary.
Pittsfield	1901, 1915	4	35	Sand; mostly found in place	One man all the time; others when necessary.
Southbridge	1908, 1925, 1926	4	40	Sand and gravel; considerable quantity handled, some found in place	One man all the time.
Spencer	1897, 1923, 1935	4	–	Sand and gravel; largely found in place	One man all the time; others when necessary.
Stockbridge	1899, 1921, 1922	3–4.5 3.4–5	23 30	Sand filters Irrigation area, sand	One man all the time.
Westborough	1892, 1911	5	30–40	Sand and gravel; handled in construction	One man all the time; others when necessary.
Winchendon	1928	–	–	Sand and gravel; found in place	One man part time.
Worcester	1898 [2,3], 1925	–	–	Trickling filters, sand area not in use	Chemist in charge; several men all the time.

[1] Sand filters abandoned Nov., 1935. Imhoff tank, trickling filter and secondary tank installed.
[2] Year of first construction of sand filters. Many additions.
[3] Sedimentation tanks and sand beds abandoned 1925. Imhoff tanks, trickling filters and secondary tanks installed.

Examination of Sewer Outlets Discharging into the Sea

A considerable amount of time of the Division during the past year has been spent in connection with the investigation relative to the pollution of Boston Harbor under the provisions of special resolves of the Legislature of 1935 and 1936, and the report relative to this investigation has been printed as House 1600 of 1937.

In the town of Acushnet the question of the discharge of septic tank effluent into surface water drains which have an outlet into the Acushnet River, a tidal stream, was raised during the year and under date of December 11, 1936, the Department recommended that a suitable sewerage system be constructed in the thickly settled parts of the town.

No progress beyond that of a preliminary investigation appears to have been made in connection with the collection and treatment of the sewage from the city of Fall River, although general plans for such works were approved by the Department in 1935. Late in the year the Governor of Rhode Island sent a communication to His Excellency, the Governor of Massachusetts, relative to the pollution of Mount Hope Bay which is due quite largely to the sewage of Fall River. This matter was under investigation at the end of the year.

The question of Rockport sewerage with an outfall into the sea has been under consideration for a number of years and under date of December 17, 1936, the Department stated that it could not recommend the utilization of street drains for common sewers and urged that the town obtain private engineering advice in the matter. It is understood that a plan for sewerage for the thickly settled parts of the town with an outfall into the sea was under preparation at the end of the year.

Complaint was made in the summer of 1936 relative to the pollution of the tidal waters in Johnson's Creek in Wareham due to the discharge of wastes from a laundry. The Department has recommended methods of correcting this source of pollution but only partial works had been constructed at the end of the year. Probably the most satisfactory method of correction will be the construction of a sewerage system in the thickly settled parts of this town with suitable works for sewage disposal. Such works were recommended by the Department on November 16, 1936.

Shellfish

In accordance with its duties under the provisions of Chapter 130 of the General Laws, as amended, this Division, in response to various applications and petitions, has continued to examine various portions of the waters and flats along the coast and shellfish taken therefrom. As a result of these examinations restrictions on the taking of shellfish were removed from an additional portion of the waters of Clark's Cove in New Bedford and Dartmouth and were replaced at Stony Beach in Hull, Boynton's Flats in Gloucester, and a portion of the easterly shore of the Apponaganset River in Dartmouth.

The Division has continued its general supervision of shellfish purification plants and in April the Department adopted revised rules and regulations for the operation of such plants. In accordance with these rules and regulations certain areas have been approved for the taking of shellfish for purification purposes in Boston, Lynn, Newburyport and Salem harbors. The plant in Newburyport has been in operation throughout the year, but the one in Plymouth was shut down on November 2, 1936, due to an insufficient volume of business. During the year a total of 6,260 barrels of soft shell clams were treated at the Newburyport plant and 3,442 at the Plymouth plant.

Shellfish purification plants have been established in Massachusetts in order to protect the public health from shellfish taken from waters exposed to pollution, but since the establishment of these purification plants the Department has received increasing demands to open up grossly polluted areas for the taking of shellfish for purification purposes. The Division realizes that these plants cannot be successfully operated unless on a sound economic basis but it also realizes that to permit the taking of shellfish for food from certain areas in Boston Harbor and other waters receiving large quantities of domestic sewage, including sewage from infectious disease hospitals, even after purification, is unwise and accordingly has refused to approve the taking of shellfish from such areas. The interests of the fishermen and the public are similar inasmuch as it is to the advantage of both to market only such shellfish as may under all conditions be safely consumed as food.

During the year representatives of the Department, at the request of the Supervisor of Marine Fisheries, examined 616 shell stock and shucking plants, and in addition 600 inspections were made of shellfish plants which ship their products out of State. The Commissioner of Public Health requested the Supervisor of Marine Fisheries to suspend the shellfish certificates of 30 shucking plants which were found to be operating in an unsanitary manner. Seven convictions were made of dealers who were found to be handling sewage polluted shellfish. Several shipments of shellfish which were being shipped into the State illegally were intercepted and sent back to their source. During the year the Department acted on 316 applications for the approval of certificates for shipping shellfish into the State from other producing states and provinces.

Special Investigations

As a result of the passage of certain resolves by the Legislature, the Sanitary Engineering Division has been called upon to participate in the largest number of special investigations that has ever been undertaken before in any previous year. These investigations were as follows:

Chapter 4 of the Resolves of 1936 — Authorizing the Department of Public Health to make tentative rules and regulations to protect the purity of interstate waters used as sources of public drinking water supply.

Chapter 42 of the Resolves of 1935 — As revived and continued under the provisions of Chapter 5 and Chapter 36 of the Resolves of 1936 providing for an investigation relative to the discharge of sewage from the Metropolitan Sewer District into Boston Harbor and its tributary waters and relative to certain related matters.

Chapter 6 of the Resolves of 1936 — Providing for an investigation relative to the advisability of restricting or otherwise modifying certain rights and powers of the Salem and Beverly Water Supply Board.

Chapter 18 of the Resolves of 1936 — Providing for an investigation by the Metropolitan District Commission, the Metropolitan District Water Supply Commission and the Department of Public Health relative to the setting off of a portion of Lake Cochituate in the town of Natick for boating and fishing.

Chapter 32 of the Resolves of 1936 — Providing for the continuance of Chapter 11 of the Resolves of 1935 enacted for the purpose of studying and investigating the public health laws and policies of the Commonwealth.

Chapter 42 of the Resolves of 1936 — Providing for an investigation by the Department of Public Health relative to the use of the Wading River as a source of water supply for the city of Attleboro.

Chapter 48 of the Resolves of 1936 — Providing for an investigation by the Metropolitan District Water Supply Commission and the Department of Public Health relative to improving the distribution of water and more adequately preventing pollution of the sources of water supply of the Metropolitan Water District.

Chapter 49 of the Resolves of 1936 — Providing for an investigation by the Department of Public Health in co-operation with the Federal Works Progress Administration relative to the sanitary condition of the Blackstone, Hoosick, Housatonic and Nashua rivers within the limits of the Commonwealth.

Reports as called for in these investigations have been made to the Legislature as required. The report under Chapter 48 of the Resolves of 1936 will be filed with the Legislature the first Wednesday in December in the year 1937.

Civilian Conservation Corps and Other Camps

The Engineering Division has continued its program of assisting the authorities of the Civilian Conservation Corps Camps by making bacterial examinations of the various sources of water supply in use at these camps and, where requested, by advising in matters of sewerage and sewage and refuse disposal. In addition, this Division has assisted in examinations of water supplies and sewage disposal works at a number of recreational camps.

Rural Sanitation

During the early part of the year this Division continued its investigations of water supplies and works for the disposal of sewage at rural schoolhouses under a Federal Works Progress Administration Community Sanitation Project, but

because of the difficulties of obtaining local appropriations to construct the necessary sanitary works the project was cancelled on June 30, 1936. Prior to the cancellation of this project, water supplies and works for the disposal of sewage at some 350 schoolhouses had been examined and 100 Federal projects approved for construction.

Compacts

During the past year under the provisions of Chapter 278 of the Acts of 1936 and under the provisions of Public Resolution No. 104 of the 74th Congress, First Session, this Division has assisted in negotiations with other New England States with a view to forming compacts to regulate the development and the improvement of interstate waterways. In this connection several field examinations have been made and a number of meetings have been held. The results of these examinations and meetings indicate that an effort should be made to provide compacts leading to the construction of storage basins not only to prevent floods but also to equalize the flow in certain of the major streams, viz., the Merrimack River and the Connecticut River so as to improve conditions resulting from pollution and to utilize these stored waters for generating power.

Cross Connections

During the latter part of the year, the Division has had the full time services of an engineer under a Federal grant in the study of cross connections between public water supplies and fire and industrial supplies. Funds for this purpose have been made possible by the United States Public Health Service. Thus far the results of this investigation have shown that the advice of the Department to industries and others in 1927 and in subsequent years in this regard has not generally been followed. Accordingly, the Department requested the advice of the Attorney General relative to its authority under Section 160 of Chapter 111 of the Tercentenary Edition of the General Laws to regulate such connections. The following opinion of the Attorney General in the matter was received under date of November 19, 1936:

"Replying to your letter of November 14th, I am of the opinion that your department has authority to adopt the rules and regulations relative to cross connections between public water supplies and fire and industrial water supplies, set forth therein."

In conformity with this opinion consideration was being given during the latter part of the year to the question of the adoption of rules and regulations providing for the installation of approved double check valves on all fire service and industrial cross connections before January 1, 1938.

Engineering Work at State Institutions

The work of the Division in connection with the State Institutions during the past year has consisted of the supervision of the construction of a section of the trunk sewer with a sedimentation basin, dosing tank, sludge beds and the reconstruction of two sand filters at the Wrentham State School, additional sewage treatment works consisting of a new trunk sewer and a sedimentation basin and dosing tank at the Westfield State Sanatorium to care for the sewage of that institution, and the resurfacing of the sewage filters at the Pondville and Medfield State hospitals. In addition the Division has supervised water supply and fire protection work at the institutions of the Department.

An investigation has been made and preliminary plans prepared in the matter of sewers and joint sewage treatment works at the Westborough State Hospital and the Lyman School for Boys. Final plans have been prepared for additional sewage filters at the Belchertown State School, and a study has been made relative to increasing the capacity of the sewage works at the Medfield State Hospital. Studies also have been made relative to improved drainage conditions and additional sewage filters at the Grafton State Hospital, changes in the method of the disposal of sewage at one of the dormitories at the Foxborough State Hospital, a possible connection with the Lowell sewerage system from the State Infirmary at Tewksbury, preliminary sewage treatment works at the Gardner State Colony, and for joint water supply and sewerage works in connection with contemplated new State Institutions and the State Prison Colony at Norfolk. Studies were made

at the Pondville State Hospital and the Westfield State Sanatorium for improvements in surface water drainage systems, and special studies were made of the proposed water supply and sewerage systems at the Military Reservation in Bourne and Sandwich. In addition to the above the use of water at the Medfield State Hospital has been investigated as well as the water supply and fire protection facilities at the Lyman School for Boys.

Federal Projects

As in the year 1935, much of the time of the Division has been devoted to the examination of plans and field investigations relating to Federal Public Works Administration and Works Progress Administration projects.

Examination of Bathing Places

The following existing or proposed bathing places were examined by this Division during 1936:

Arlington	Spy Pond
Arlington	Mystic River and Mystic Lakes
Attleboro	Wading River at Girl Scout Camp
Auburn	Swimming Pool in Athletic Field
Barre	Prince River at Vesper Pond
Billerica	Concord River at Camp Naomi
Chester	Westfield River at Camp Brookside Lodge
Concord	White Pond
Deerfield	Swimming Pool between Main Street and State Highway
Deerfield	Swimming Pool at Eaglebrook School
Douglas	Wallum Pond
Egremont	Swimming Pool at Old Egremont Tavern
Fall River	Mount Hope Bay at Sandy Beach
Franklin	Swimming Pool off W. Central Street
Hadley	Connecticut River at certain points in Hadley
Halifax	W. Monponset Pond at Camp Ousamequin
Holyoke	Connecticut River at Holyoke Canoe Club
Lunenburg	Whalom Lake
Lynn	Flax Pond
Marblehead	Clifton and Preston Beaches
Marshfield	Chandlers Pond
Maynard	Swimming Pool on Assabet River
Medford	Mystic River at various points in Medford
Medford	Wrights Pond
Melrose	Ell Pond
Montague	Swimming Pool on Saw Mill River
Natick	None Such Pond at Camp Mary Day
New Bedford	Swimming Pool at Y. M. C. A.
Northampton	Swimming Pool at Camp Hodgkins
Norwood	Swimming Pool on Hawes Brook
Palmer	Round Pond
Rockland	Reeds, or Studley's, Pond
Rutland	Swimming Pool at Rufus Putnam Memorial Park and Sandy Beach
Salem	Municipal Swimming Pool at Cat Cove
Saugus	Proposed Bathing Beach in Breakheart Reservation
Shelburne	Deerfield River below entrance of North River
Somerville	Mystic River
South Hadley	Paradise Pond
Springfield	Connecticut River
Springfield	Watershop Pond
Springfield	Bass Pond
Waltham	Hardy Pond
Wayland	Baldwin's Pond
Westfield	Westfield River and Steiger Park Wading Pool
Winchester	Aberjona River above Mystic Lakes
Winthrop	Boston Harbor

Water and Sewage Laboratories and Lawrence Experiment Station

A large amount of analytical and research work concerning problems of water supply, water purification, sewage and sewage disposal, the treatment of industrial wastes, the condition of rivers and shellfish areas, and allied subjects was carried on during the year 1936 by the Water and Sewage Laboratories and the Lawrence Experiment Station. Many chemical analyses and bacterial examinations were necessitated in connection with certain resolves of the legislature requiring an investigation relative to the discharge of sewage into Boston Harbor and its tributary waters. The demands of Federal projects also increased the work.

Water and Sewage Laboratories

In carrying out the work of these laboratories during the year 9,740 chemical analyses and 3,624 microscopical examinations were made. Each regular chemical analysis called for a number of determinations ranging from thirteen to twenty-five, according to the source of the sample.

Some of the special work carried out has been as follows: —

Analysis of the solids removed from a corroded hot water coil showed that the material consisted mainly of zinc salts from the corroded brass pipe.

Analysis of samples of colored crayons, made in connection with a lead poisoning case in a school in Dover, showed that these crayons contained 4 per cent of lead by weight or approximately .16 gram per inch of crayon.

Analysis for fluorine in the public water supplies of Fairhaven, Holliston, Marshfield, Metropolitan (Boston), Millis, Nantucket, Newton, Norton, North Adams, North Easton, Provincetown, Sturbridge, Townsend, Waltham and West Groton, gave negative results. In connection with these analyses, it may be interesting to note that, according to H. V. Churchill* in an article on "The Distribution of Fluorine in Waters from Various Parts of the United States," traces, at least, of fluorides are to be expected west of the Appalachians but in no case were fluorides found in waters east of the Appalachians.

The possibilities of contamination of water supplies through the use of a spray gun containing cartridges of arsenate of lead attached to a garden hose was demonstrated when it was found that after shutting off the water at the sillcock and later at the spray gun nozzle 12 parts per million of arsenate of lead were found in the water remaining in the garden hose.

Experiments to accelerate the natural sedimentation of iron in water from Chester Brook, Waltham, indicated that a dosage of 100 parts per million of slaked lime was most effective.

Tests were made on three pipe-joint compounds and while it was found that the ingredients consisted mostly of carbonate and silicate of calcium and aluminum, together with traces of iron and manganese all incorporated in linseed oil, one of these compounds contained an appreciable quantity of lead and when 5 grams of this compound was allowed to stand sixteen hours in one gallon of Metropolitan water .16 parts per million of lead was dissolved therein.

The chemical treatment of boiler-feed waters has in recent years brought out several chemical compounds, called rust eradicators, intended to reduce corrosion and retard scale formation within the boiler. The following table presents the results of analyses showing the main ingredients of one type in common use: —

	Per Cent	*Parts per Million*
Water	39.5	–
Sodium silicate	58.8	–
Potassium chromate	1.4	–
Hydroxide alkalinity†	–	115,000
Total alkalinity†	–	165,000

* Jour. Ind. & Eng. Chem. 23, pp. 996–98, 1931.
† Calculated as calcium carbonate.

The active agents in this particular type are sodium silicate and potassium chromate. Potassium chromate is sometimes used to inhibit corrosion by rendering iron inactive or "passive" toward certain corrosive agents. Concentrations of from .05 to .20 per cent of this salt are said to be most effective. However, it may be noted that heating will destroy this "passive" state so that the use of chromates in boiler systems would be ineffective. The study of the water in three breeding ponds at the Sandwich State Fish Hatchery showed that excessive organic acid and lack of oxygen caused the death of fish.

The laboratories had visitors during the year from the following places: — University of National Defense, Turkey; Westminster, England; Metropolitan Water Board, London; State Bureau of Health, Augusta, Me.; Massachusetts Institute of Technology, Cambridge; Lesley School, Cambridge; Whidden Hospital, Everett; Mechanic Arts High School, Boston; Carter School, Chelsea; and Junior High School, Winthrop.

The following table gives a summary of the analytical work carried on in the State House laboratories: —

Water and Sewage Laboratories, State House

Samples from public water supplies:		
Surface waters	2,571	
Ground waters	1,448	
Special samples:		
Surface waters	156	
Ground waters	892	
Samples from rivers	1,436	
Samples from sewerage systems and sewage disposal works	1,416	
Samples of wastes and effluents from factories	48	
Samples analyzed in connection with Boston Harbor investigation	1,445	
Miscellaneous samples (partial analyses)	328	
		9,740
Microscopical analyses	3,624	
Special samples analyzed for lead (38); copper (9); arsenic (6); oil (2); fluorine (15); moisture and volatile matter in sludge (4); chlorine demand (5); carbonic acid (15); analyses of rust eradicator (3); pipe-joint compound (3); crayons (5); residue from hot water coil (1); floating matter (1)		107
Total		9,847

Lawrence Experiment Station

During 1936 many examinations of rivers, water supplies, swimming pools, water filtration plants and sewage filtration areas have been made. Results have been reported on experiments made on sewage and industrial waste disposal, water purification, chlorine treatment, the condition of water supplies and swimming pools, and the removal of free carbon dioxide, iron and manganese from water supplies.

Members of the staff worked night and day for twelve days at the Lawrence city filters during the severe floods of March when the Experiment Station was inundated by the high water of the Merrimack River. Additional research has been done on methods of shellfish examination and some time was devoted to the work of the bacteriological laboratories at shellfish plants. A bacteriologist testified in the prosecution of seven cases of violation of shellfish laws.

In connection with the surveys of the Housatonic, Hoosick, Blackstone and Nashua rivers made under the Federal Works Progress Administration, many analyses, including a number of biochemical oxygen demand (B.O.D.) determinations, have been made of the water of these rivers and on the industrial wastes discharged into them. B.O.D. determinations have been made also on samples of the Merrimack River water and other streams.

In this report the results of the experimental work done at the Lawrence Experiment Station are first summarized and then discussed more fully under the separate headings.

Digester liquors from paper mills can be successfully treated when not more than 1.25 per cent of waste is mixed with domestic sewage and the mixture filtered through trickling filters at a rate of 1,500,000 gallons per acre per day.

About 82 per cent of the tannins in leatherboard waste can be destroyed when the waste is diluted with an equal volume of water and filtered through a bed of sand at a rate of 50,000 gallons per acre per day. Tannins appear to be completely destroyed in waste which is diluted with four volumes of sewage when the mixture is filtered through sand at a rate of 50,000 gallons per acre per day.

Preliminary results show that a mixture of 20 per cent garbage and 80 per cent sewage solids by weight digest satisfactorily in an Imhoff tank with a slight lowering of the pH value. Mixtures of equal parts, and of 1 part by weight of sewage sludge and 1.4 parts of garbage were treated satisfactorily in septic tanks.

Intermittent sand filters are operated most efficiently by applying sewage every day in one dose as rapidly as practicable so as to cover the whole surface of the filter uniformly. The application of several days' supply of sewage within a few hours is detrimental to satisfactory operation. A good filter sand has an effective size of .25 to .35 millimeter and a uniformity coefficient of 4.0 or less. Filters 3 feet deep seemed to give satisfactory results but 1- and 2-foot filters gave a remarkable amount of purification considering the depth.

Samples taken at depths of 4, 6 and 8 feet in a trickling filter show progressive purification down through the bed. Pre-treatment of the sewage with ferric sulphate and aeration was beneficial.

A trickling filter, operated at the rate of 17,800,000 gallons per acre per day, gave a reduction in B.O.D. of 57 per cent; when 20 per cent of the effluent was returned to the filter, the reduction was 67 per cent.

When Merrimack River water was stored thirty days 99.58 per cent of members of the coli-aerogenes group and 97.68 per cent of the bacteria growing at 20°C. were removed.

During 1936 an average of 4,842,000 gallons of Merrimack River water was filtered each day at the Lawrence city filters. This filtered water was treated with 1.63 parts per million of chlorine.

A study of the viability of sewage organisms in sea water indicates that on discharging sewage into salt water, a reduction of about 18 per cent in fifteen minutes and about 27 per cent in sixty minutes could be expected in the bacteria growing on agar at 37°C.

Samples of jute used in calking water-pipe joints were found to contain members of the coli-aerogenes group. When the jute was placed in sterile water and incubated at 70°F., the number of bacteria increased enormously. When polluted water was added to sterile jute and the mixture allowed to stand, a large increase in the number of bacteria resulted. Chlorination was not effective in sterilizing the jute but steam under pressure was satisfactory.

Research work on methods of sewage purification was interrupted for a time because the pipe supplying sewage for experimental filters was carried away by the flood.

All bacterial work on water, sewage and shellfish, including the general oversight of inland waters, has been done at the Lawrence Experiment Station and, in accordance with the practice of recent years, co-operative studies have been made with the laboratory of the Metropolitan District Commission concerning bacterial analyses.

The spring flood necessitated the abandonment of the Lawrence Experiment Station on March 19 when the water reached the top of the benches where the chemists and bacteriologists were working. The men loaded a boat at the work benches and took with them current bacteriological records and the tubes then in the incubators. A temporary laboratory was set up in a shed on adjoining property and incubation was maintained with the aid of a gas range in the home of one of the chemists. In addition, it was necessary for the Department to distribute considerable bacteriological work to the Tri-town Laboratory at Lee and the Pittsfield City Laboratory in the valley of the Housatonic River; the laboratory of the Massachusetts State College and the laboratory of the Springfield Water Department in the Connecticut River valley; to the laboratories at Harvard College and

the Massachusetts Institute of Technology; and to one of the Boston consulting engineers who maintains a laboratory in the city of Boston.

During the year persons visited the Experiment Station from the Massachusetts Institute of Technology, Lowell Textile School, the Lawrence Memorial Hospital, Medford, Duke University; and from Canada, England and China.

The analytical work carried on at the Experiment Station is summarized in the following table and a resumé of some of the research work is submitted in the following pages:

Lawrence Experiment Station

Chemical analyses made in investigations of the disposal of domestic sewage and industrial wastes, filtration and other treatment of water supplies, swimming pools, and the investigation of the Merrimack and other rivers	2,287
Mechanical and chemical analyses of sands	197
Bacterial examinations of water supplies, rivers, sewages and filter effluents, ice, swimming pools, industrial wastes, sea water, and the investigation of Boston Harbor	11,599
Bacterial examinations in connection with methods of purification of sewage and water	938
Bacterial examinations of shellfish	531
Total	15,552

Treatment of Paper Mill Digester Liquors

In one of the Massachusetts towns, plans are being made for a trickling filter to treat the sewage and the question has arisen as to whether the digester or cooker liquors from two paper mills (Mill No. 1 and Mill No. 2) could be treated with the sewage without injury to the filter. The liquors which result from the cooking of rags under steam pressure with caustic soda, soda ash, or lime are very strong, and contain as high as 7.9 per cent total solids and 3.6 per cent volatile matter. In addition to the cooker wastes there are rinse waters from washing the cooked fiber. Experience at the Experiment Station has shown that this type of waste can be successfully treated only by filtration after sufficient dilution with sewage.

In the case under consideration 10,100 gallons of cooker liquor, 8,100 gallons of first cooker rinse and 5,100 gallons of second cooker rinse, making a total of 23,300 gallons, are produced daily, which is 1.86 per cent of the estimated 1,250,000 gallons, the daily volume of domestic sewage.

To study the effect of these wastes on the operation of trickling filters, five small filters, containing 10 feet in depth of crushed stone which will pass a 1½-inch screen and be retained by a ¾-inch screen, have been operated at the Experiment Station for about six months at a rate of 1,500,000 gallons per acre daily. Filter No. 653 has been operated as a control with Lawrence sewage; Filter No. 654 has received Lawrence sewage with 0.5 per cent of waste; Filter No. 655, 1.25 per cent; Filter No. 656, 1.86; and Filter No. 657, 2.5 per cent. The wastes from the different mills and processes were mixed in the proportion in which they are produced and allowed to settle for a period of one hour before they were applied to the filters. As the effluents from the filters receiving the waste contained unusually large amounts of suspended matter at irregular intervals, all analyses were made on samples of the effluent which had been settled one hour.

An examination of the average analyses shows that 0.5 per cent of waste has practically no effect on the stability of the effluent but with 1.25 per cent of waste, the relative stability is reduced. The two higher percentages, 1.86 and 2.5, have about the same effect. Nitrification is not seriously affected by the two larger amounts of waste, indicating that the waste does not affect the bacterial action in the filter. The green color of the effluents which increased with the amount of waste applied was due to blue dyes in the wastes from Mill No. 2. With a reasonable amount of dilution, the color should not be objectionable.

As a result of these experiments it seems probable that if the conditions of these experiments are duplicated in the proposed plant, the wastes may be added to the sewage and a fair degree of purification obtained. About 1.25 per cent of waste is

apparently as much as can be added without increasing the B.O.D. and reducing the relative stability to an undesirable degree. The filter receiving 1.86 per cent of waste produced a well-nitrified effluent but the B.O.D. was so high that the relative stability was considerably reduced. It would probably be safer to include some of the weaker wastes in order to increase the volume of sewage and wastes so that the concentration of the stronger wastes would be around 1.25 per cent. The wastes, particularly from Mill No. 2, should be settled before being discharged to the sewer unless all of the sewage is efficiently settled before filtration. It is very important, of course, that the wastes be discharged to the sewer at a uniform rate.

Treatment of Paper Mill Wastes with Domestic Sewage
Average Analyses
(Parts per Million)

Waste from	Ammonia			Kjeldahl Nitrogen		Oxygen Consumed	Fats	B.O.D.
		Albuminoid						
	Free	Total	In Solution	Total	In Solution			
Mill No. 1:								
Cooker liquor	42.6	184.	171.	311	291	6,772	145	6,500
First cooker rinse	14.7	39.4	35.2	63	57	1,176	113	1,818
Second cooker rinse	9.4	26.6	24.6	42	40	904	83	1,148
Mill No. 2:								
Cooker liquor	32.2	359.	267.	498	368	8,867	1,491	4,240
First cooker rinse	9.6	135.	111.	180	150	3,420	959	2,420
Weighted composite of all wastes	23.1	140.	107.	211	179	4,168	449	3,107

Average Solids
(Parts per Million)

Waste from	Unfiltered			*In Suspension		
	Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed
Mill No. 1:						
Cooker liquor	41,580	28,970	12,610	595	540	55
First cooker rinse	7,832	5,619	2,213	236	181	55
Second cooker rinse	6,129	4,096	2,033	54	26	28
Mill No. 2:						
Cooker liquor	79,240	35,885	43,355	3,250	2,943	307
First cooker rinse	28,310	11,670	16,640	644	592	52
Weighted composite of all wastes	30,860	18,308	12,552	838	747	91

*By Gooch crucible.

Treatment of Paper Mill Wastes with Domestic Sewage
Average Analyses
(Parts per Million)

Effluent from Filter Number	Per Cent Waste mixed with Applied Sewage	Ammonia			Kjeldahl Nitrogen		Nitrogen As—		Oxygen Consumed	Relative Stability	B.O.D.
			Albuminoid								
		Free	Total	In Solution	Total	In Solution	Nitrates	Nitrites			
Sewage*	–	65.5	9.10	5.02	16.	8.5	–	–	65	–	242
653	.00	40.3	4.61	2.99	8.1	5.3	17.8	.38	26	95	48
654	.50	36.0	5.04	3.24	8.7	5.8	20.4	.37	30	94	56
655	1.25	35.3	5.35	3.92	9.6	6.8	18.0	.42	42	82	74
656	1.86	31.5	6.58	4.63	12.	8.2	16.1	.53	60	67	102
657	2.50	29.1	6.31	4.67	12.	8.3	14.3	.58	61	67	102

*Lawrence sewage applied to these filters.

Leatherboard Wastes

In the manufacture of leatherboard, scraps from leather tanned with organic tanning compounds, together with some paper, are shredded and treated with water in beaters in much the same manner as in the manufacture of paper. During this process of separating the leather scrap into fiber some of the tannins are leached out although most of them remain in the finished leatherboard. The term "tannins" is used here in its broadest sense and does not refer to any one compound. The liquid in the beaters is kept concentrated in order to retain as large a proportion of the dissolved matters in the wet board as possible but concentration of the solids in the liquid beyond a certain point has an injurious effect on the finished product.

Because a certain plant was discharging this waste into the Taunton River and discoloring the water to such an extent as to interfere with the use of the water as a source of supply for a State institution, experiments to determine the best method of treating the wastes were conducted at the Experiment Station.

The combination of tannin and iron forms a black compound, the reaction being similar to that used in the manufacture of some kinds of ink. The color of the waste is brown but this alone only increases the natural color of the water. In the case in question, serious trouble is experienced only when the flow of the river is low. At this time, the concentration of iron in the water may be as high as 2.0 parts per million. The result of the discharge of these wastes into the stream under these conditions is a decided discoloration or blackening of the river water.

Leatherboard wastes are higher in solids and organic matter than most industrial wastes but the organic matter is in a very stable form and while, of course, undesirable in any stream, it does not ordinarily cause a nuisance.

In trying to improve conditions at the plant in question, attention was centered on so changing the tannins that they would not react with the iron in the river water, rather than on reducing the organic matter as a whole. All tests with chemical precipitation were unsuccessful. The tannins are acidic in nature, and as large amounts of organic acids are destroyed in properly operated digestion tanks, it was thought that these substances might be removed by digestion. There was some reduction of the acids when the waste was passed through a bottle of digesting sewage sludge but the tannins combined with the iron compounds in the sludge to produce a black-colored effluent, making this treatment impractical.

Some of the small filters first used in the filtration experiments were of galvanized iron but these had to be abandoned because of the same blackening effect. Finally, three filters, Nos. 659, 664 and 665, were made up of 3-inch glass percolators placed one above the other and filled to a depth of 3 feet with sand of an effective size of .25 millimeter. To Filter No. 659 settled waste diluted with 50 per cent of tap water was applied at a rate of 50,000 gallons per acre daily. The operation of this filter resulted in an average reduction in tannins of 82 per cent as measured by the volume of the effluent required to give the same amount of blackening as the raw waste when the latter was diluted with water containing 2.0 parts per million of iron. The liquid applied to this filter contained only 50 per cent of waste but the reduction in albuminoid ammonia was 13 per cent and in oxygen consumed 31 per cent. The raw waste contained from 29,000 to 400,000 bacteria per cubic centimeter, showing that the organic matter was not well adapted to bacterial growth, at least in this concentration. It was obvious from these conditions that not much bacterial purification could be expected from filtration, although the reduction of tannins was satisfactory.

Eventually the town where this plant is located will put in a sewerage system and these wastes should be treated with the town sewage. Accordingly, two sand filters made of glass percolators, the same as Filter No. 659, have been operated with mixtures of waste and sewage to determine the effect of the waste on the operation of intermittent sand filters. Filter No. 664 received 10 per cent of waste and 90 per cent of sewage, and Filter No. 665 received 20 per cent of waste and 80 per cent of sewage. Both were operated at rates of 50,000 gallons per acre daily. The ability of the tannins to form a colored compound with iron was completely destroyed by this treatment and the results indicated that from 10 to 20 per cent of this waste can be mixed with sewage without interfering with the operation of sand filters.

The main objection to any form of filtration of leatherboard waste is the increase in color from oxidation of the coloring matters in the waste. The color of some of the effluents was frequently five times that of the raw waste.

It seems practicable to operate a filter like No. 659 to successfully treat a 50 per cent mixture of waste and water if the suspended matters are thoroughly removed. This presents some difficulties because the relatively high specific gravity of the waste which contains around 1.5 per cent of soluble solids tends to make the suspended solids settle slowly. Laboratory tests show that when the waste is diluted with 90 per cent water the suspended solids settle more readily. Filter No. 659 was operated several weeks at a rate of 250,000 gallons per acre daily with this diluted settled waste. Under these conditions it was handling the same volume of waste as before and the removal of tannins was slightly better.

Treatment of Leatherboard Waste by Filtration through Sand
Average Analyses
(Parts per Million)

Ammonia			Kjeldahl Nitrogen						
	Albuminoid								
Free	Total	In Solution	Total	In Solution	Chlorides	Nitrogen as Nitrates	Oxygen Consumed	Alkalinity (Phenolphthalein)	Tannin (Per Cent reduction)
				Settled Leatherboard Waste					
3.10	11.2	6.42	20	9.4	290	–	7,810	–1,124	–
				Effluent from Sand Filter No. 659 (50% waste and 50% water applied)					
2.44	4.95	–	–	–	150	.20	2,610	–	82
				Mixture of 10% Settled Leatherboard Waste and 90% Lawrence Sewage applied to Sand Filter No. 664					
21.3	8.62	5.38	16	9.6	80	–	840	–	–
				Effluent from Sand Filter No. 664					
11.9	1.06	–	–	–	86	27.0	92	–	100
				Mixture of 20% Settled Leatherboard Waste and 80% Lawrence Sewage applied to Sand Filter No. 665					
19.3	8.90	5.49	16	9.6	104	–	1,614	–	–
				Effluent from Sand Filter No. 665					
1.13	1.49	–	–	–	120	6.05	304	–	100

Average Solids
(Parts per Million)

	Unfiltered			*In Suspension		
	Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed
Settled leatherboard waste	14,912	10,927	3,985	328	280	48
Mixture of 10% waste and 90% sewage . .	–	–	–	162	141	21
Mixture of 20% waste and 80% sewage . .	–	–	–	181	157	24

*By Gooch crucible.

Character of the Sewage used in the Investigations of Sewage Purification at the Lawrence Experiment Station

The sewage used for experimental purposes at the Lawrence Experiment Station is pumped from the Osgood Street sewer, on the opposite side of the Merrimack River, to the Experiment Station through about 1,850 feet of pipe. During the

March flood the portion of the pipe in the river was broken and carried away. In October, the old pipe, 2½ inches in diameter, and the old pump were replaced by a new 3-inch pipe and a centrifugal pump capable of pumping about 65 gallons a minute. The sewage supplied by the new equipment is considerably stronger than formerly, indicating some leakage in the old pipe.

The following tables present the average analyses of the sewage used during the year 1936. The term "regular sewage" refers to the sewage pumped to the Station. From the first of the year to the middle of March "settled sewage" was the same sewage which had passed through Imhoff Tank No. 545 and received some additional settling in a large tank used for supplying all the filters at the Station except Nos. 1, 4, 9A and 639. From the middle of October to the end of the year, regular sewage was pumped direct to this large tank where after some settling it became "settled sewage." Imhoff Tank No. 545 was designed to receive the output of the old sewage pump which had a capacity of not more than 10 gallons a minute. Since the change, sewage has been run from the large tank at about 10 gallons a minute through the Imhoff tank and the effluent applied to the outdoor Filters Nos. 1, 4, 9A and 639. The sludge settling out in the large tank has been added to the Imhoff tank. The sewage applied to all the small sand filters from May to October was that produced at the Experiment Station and was very high in free ammonia and low in organic nitrogen. During the remainder of the year settled sewage was applied.

Disposal of Ground Garbage with Sewage

During the past few years there has been a growing interest in the disposal of household garbage through sewerage systems after grinding in apparatus provided for the purpose either in the house or at some central point of collection. Various opinions as to the advantages and disadvantages of such disposal have been expressed and while there seems to be little doubt that garbage can be so disposed of without seriously interfering with sewage treatment processes, it was deemed advisable to carry out some experiments in this regard at the Lawrence Experiment Station.

The garbage used has been from the kitchens of members of the Lawrence Experiment Station staff and during the grinding sewage has been used for flushing instead of water. An average of ten analyses of the mixed sewage and garbage showed 25.7 per cent of dry solids, 1.43 per cent of nitrogen and 25.3 per cent of fats. Of the dry matter, 96.6 per cent was volatile. The bulk of the garbage consisted of the waste portions of fruits and vegetables. The fats varied more than the dry matter or nitrogen, ranging from 3.3 per cent to 50.8 per cent.

Imhoff Tank

The Imhoff Tank, No. 545, operated during the year is made of concrete, 20 feet deep, with a settling compartment 7 feet 4 inches long by 1 foot wide and has gas vents 1 foot square at each end. The bottom of the settling compartment has a slope of 45 degrees toward the center where there is a slot opening. The digestion compartment has a capacity of 357 gallons while the settling compartment has a capacity of 715 gallons, giving a theoretical detention period of about one and one-half hours during the seven to eight hours a day that the sewage is being pumped. Settleable solids were removed during the year at the rate of 1,016 pounds of dry matter per million gallons of sewage. Up to the middle of October, sewage was pumped direct to the Imhoff tank. After that time, sewage was run to the Imhoff tank from the main settling tank which supplies the filters.

Sludge settling out in this settling tank has been applied to the Imhoff tank. This amounted to 84 pounds of dry matter. In addition, ground garbage equal to 121 pounds of dry matter was added. The solids settling out of the sewage passing through the Imhoff tank amounted to 419 pounds, making a total of 624 pounds of dry solids added to the digestion chamber. Eighty-six pounds of well-digested sludge were drawn from the outlet and three times during the year a total of seventy-five pounds of less thoroughly digested sludge was removed from the gas vents. The average composition of the dry digested sludge was, — fats, 14.5 per cent; nitrogen, 4.02 per cent; volatile matter, 67.6 per cent. The only effect experienced

so far from the addition of ground garbage has been a slightly increased tendency of the sludge to rise in the gas vents.

Average Analyses of Lawrence Sewage

(Parts per Million)

Ammonia			Kjeldahl Nitrogen						
	Albuminoid								
Free	Total	In Solution	Total	In Solution	Chlorides	Oxygen Consumed	B. O. D.	Fats	Bacteria per Cubic Centimeter 4 Days—20°C.
Regular Sewage									
41.0	12.8	6.45	24	12.	51	91	633	56	4,100,000
Sewage after passing through Imhoff Tank No. 545									
40.4	7.56	4.85	13	8.8	48	62	422	51	3,900,000
Settled Sewage									
35.1	8.85	5.23	16	9.3	50	73	513	33	4,800,000
Sewage applied to Small Sand Filters									
59.4	9.09	5.05	16	8.7	51	67	247	–	4,800,000

*Average Suspended Solids**

(Parts per Million)

	Total	Loss on Ignition	Fixed
Regular sewage	230	197	33
Sewage after passing through Imhoff Tank No. 545	108	90	18
Settled Sewage	177	153	24
Sewage applied to small sand filters	150	129	21

*By Gooch crucible.

Septic Tanks

Septic Tanks Nos. 507 and 508 have been operated at the Experiment Station since June, 1920. Tank No. 507 is 4 feet long, 2 feet wide and 40 inches deep, with a sloping bottom and has a capacity of 185 gallons. Tank No. 508 contains two compartments of the same size as the first and has a capacity of 370 gallons. Sewage enters each tank through trapped inlets and discharges through a pipe reaching 15 inches below the surface of the sewage in the tank. A baffle, located one-third of the distance from the inlet to the outlet, reaches to within 8 inches of the bottom of the tank. Tank No. 507 receives practically fresh household sewage and Tank No. 508 receives Lawrence sewage, which is comparatively stale. Both tanks are so operated that theoretically the sewage is held in each for two days; that is, the amount of sewage added daily is equal to one-half the capacity of the tanks, disregarding the effect of the accumulated sludge.

In adding the ground garbage to Septic Tanks Nos. 507 and 508, it was planned to add as much garbage on a dry basis as the tanks received of dry suspended sewage solids. During the last ten weeks of the year, Septic Tank No. 507 received 29.5 pounds of sewage solids and 24.4 pounds of garbage solids and Septic Tank No. 508 received 19.5 pounds of sewage solids and 43.4 pounds of garbage. All surplus garbage was added to the sludge in Imhoff Tank No. 545 without regard to the proportion of sewage solids. It received 503 pounds of sewage solids, including sludge removed from the large settling tanks, and 121.2 pounds of dry garbage.

The experimental work has not been carried on long enough to permit drawing any definite conclusions but the only noticeable effect on the septic tanks in two months of operation has been a slight lowering of the pH in the effluents. In Tank No. 507 the pH was lowered from 7.6 to 6.5 and in Tank No. 508 from 7.1 to 6.1; in the Imhoff tank the change was from 7.2 to 6.7. The garbage has in-

creased the tendency of the sludge to rise in the gas vents but not as yet to a serious extent.

The tanks were opened for sludge measurements at the end of the year. There were 29 inches of sludge in Tank No. 507, 38 inches in the first compartment of Tank No. 508 and 20 inches in the second compartment. The sludge in Tank No. 507 was black and inoffensive; in the first compartment of Tank No. 508 only slightly offensive and in the second compartment, inoffensive. There was no sign in any of the compartments of the ground garbage that had been added. It seems probable that these tanks can successfully digest an amount of garbage solids equal to the sewage solids entering them and very possibly more. Tank No. 508 has received more than twice as much garbage as sewage solids. The slight offensiveness of the sludge in the first compartment of Tank No. 508 may indicate that it was receiving almost the maximum amount of sludge that it could handle without changing the type of fermentation.

After measuring and sampling the sludge in these tanks, part of the sludge was removed, leaving about one foot in depth in each compartment. The sludges removed from Tank No. 507 and from the first and second compartments of Tank No. 508 had the following respective compositions on the dry basis: Organic nitrogen, 3.81, 3.63 and 2.37 per cent; volatile matter, 56.0, 47.2 and 53.0 per cent; and fats, 7.0, 13.4 and 10.9 per cent.

During a large part of the period of operation, the effluents from both tanks have been remarkably clear and comparatively odorless. Besides settling out suspended solids, these tanks have effected a considerable reduction of soluble albuminoid ammonia.

Operation of Septic Tanks

Average Analyses

(Parts per Million)

Ammonia			Kjeldahl Nitrogen					
	Albuminoid							
Free	Total	In Solution	Total	In Solution	Chlorides	Oxygen Consumed	Fats	Bacteria per Cubic Centimeter 4 Days—20°C.
Fresh Sewage applied to Closed Septic Tank No. 507								
122.	25.9	12.6	44	22.	97	145	149	2,400,000
Effluent from Closed Septic Tank No. 507								
113.	12.6	8.27	22	14.	92	77	43	2,000,000
Regular Sewage applied to Closed Septic Tank No. 508								
51.8	11.5	7.16	20	13.	60	63	77	3,400,000
Effluent from Closed Septic Tank No. 508								
56.6	6.56	4.40	11	7.54	62	52	22	2,150,000

*Average Suspended Solids**

(Parts per Million)

	Total	Loss on Ignition	Fixed
Fresh sewage applied to Closed Septic Tank No. 507	638	580	58
Effluent from Closed Septic Tank No. 507	142	126	16
Regular sewage applied to Closed Septic Tank No. 508	200	158	42
Effluent from Closed Septic Tank No. 508	109	86	23

*By Gooch crucible.

Activated Sludge

Experiments on the aeration of sewage have been carried on at the Lawrence Experiment Station continuously since 1911, and descriptions and results of this work have been published in the annual reports of the Department. Activated sludge Tank No. 485, which was started in 1917, is still in operation. It has three

compartments in series, 75 inches deep, each holding 230 gallons. The overflow from the last compartment, comprising the purified sewage and considerable sludge, passes through two settling tanks with capacities of 600 and 160 gallons, respectively, allowing three and three-quarter hours' sedimentation. During this time the activated sludge settles out and is pumped back to the first compartment. The sewage is retained in the aerating compartments about three and one-half hours. Air is applied at the bottom of each compartment through a filtros plate, clamped to the top of an iron box, at a rate approximating .33 cubic feet of air per hour per gallon of sewage treated. The amount of sludge retained in the tank was considerably less than the 20 per cent by volume formerly used. Excess sludge, equivalent to 385 pounds per million gallons of sewage treated, was pumped to waste. This sludge contained, on a dry basis, 76.6 per cent volatile matter, 6.3 per cent nitrogen and 6.6 per cent fats. The mixture of sludge and aerated sewage entering the settling tank contained an average of 6.1 parts per million dissolved oxygen. The final effluent from the settling tanks has been usually clear and bright, with an average of 27 parts per million suspended solids.

Operation of Activated Sludge Tank No. 485
Average Analyses
(Parts per Million)

Appearance		Ammonia			Kjeldahl Nitrogen		Chlorides	Nitrogen as—		Oxygen Consumed	B.O.D.	Fats	Bacteria per Cubic Centimeter 4 Days—20°C.
			Albuminoid										
Turbidity	Color	Free	Total	In Solution	Total	In Solution		Nitrates	Nitrites				
Settled Sewage applied to Activated Sludge Tank No. 485													
–	–	35.1	8.85	5.23	16.	9.3	50	–	–	73	513	33	4,800,000
Effluent from Activated Sludge Tank No. 485													
8	71	25.8	2.96	2.25	5.1	4.2	53	4.37	.16	17	–	–	1,520,000

*Average Suspended Solids**
(Parts per Million)

	Total	Loss on Ignition	Fixed
Settled sewage applied to Activated Sludge Tank No. 485	177	153	24
Effluent from Activated Sludge Tank No. 485 . .	27	22	5

*By Gooch crucible.

Intermittent Sand Filters

Intermittent sand sewage filters have been operated at the Lawrence Experiment Station since it was established in 1887. Since then, 216 have been operated with sewage, besides many others with various kinds of industrial wastes. During the last five years some of the factors relating to the operation of such filters have been re-studied on an extensive scale. In the recent work, studies have been made on a number of filters operated at the same time, covering the point in question, rather than by a number of filters operated at different times.

Studies of Overdosing

The best method of operating intermittent sand filters is to apply sewage every day in one dose as rapidly as practicable so as to cover the whole surface of the filter uniformly. If the sewage is applied slowly at one or more points the entire surface will not be covered, some of the air in the sand will not be changed and those sections of the filter receiving the sewage will be operating as continuous instead of intermittent filters. It is unfortunately the practice at some treatment plants to apply during a few hours an amount of sewage equivalent to several days' supply.

As a result of these studies it has been shown that doubling the dose and flooding a filter every other day is not particularly harmful but the larger doses at longer intervals give progressively poorer results. They also show that a filter of sand of good effective size and uniformity coefficient will stand much more overloading than a filter of poorly graded sand. A good sand has an effective size of from .25 to .35 millimeter and a uniformity coefficient of not over 4.0. An unsuitable sand is one with an effective size below .15 millimeter. Usually sands with a low effective size have a high uniformity coefficient.

To show the effect of improper methods of flooding filters, a series of small sand filters, four feet deep is being operated at the Experiment Station. Filter No. 593 is operated as a control and flooded once daily; Filter No. 594 is flooded every two days; Filter No. 595, every three days; Filter No. 596, every four days; Filter No. 597, every five days; Filter No. 598, every six days and Filter No. 599, every seven days. Each filter receives an equal volume of sewage each week unless its surface becomes clogged. Filter No. 600 is a duplicate of Filter No. 593, except that 25 per cent of the filter material consists of stone between 1 and 2 inches in diameter. This coarse material apparently has little effect on the efficiency of the filters.

During 1936 the average rate of filtration was 105,600 gallons per acre daily. All of the filters of the series were able to handle this amount without surface clogging. The differences in the analyses of the different filters are not great but in a general way, the more frequent the flooding of the filter, the better the effluent. During six months of the year, due to the breakage of the sewage supply pipe during the flood, these filters received sewage produced at the Experiment Station which was higher in free ammonia and lower in organic nitrogen and suspended matter than the sewage usually applied. This probably accounted for the freedom from clogging of some of the less frequently flooded filters and for the relatively better effluents. The sand of these filters has an effective size of .25 millimeter and a uniformity coefficient of 3.1, a very favorable size for sewage purification. Many of the filtration areas of the State are of material found in place; and this is very seldom of satisfactory quality, the effective size being usually too low and the uniformity coefficient too high.

A rough, weighted average of available sand analyses from municipal areas gave an effective size of .15 millimeter and a uniformity coefficient of 5.6. A mixture of sands of this effective size and uniformity coefficient was prepared and used in a series of filters, Nos. 643 to 649, inclusive. These filters, containing 4 feet in depth of this sand, were started June 13, 1935, and operated exactly the same as the series of Filters Nos. 593 to 599, inclusive. Filters Nos. 643 to 649, inclusive, show more clearly the progressively poorer purification as the interval between floodings is increased.

Filters Nos. 1, 4, 9A and 639

Filters Nos. 1, 4, and 9A are each 1/200 of an acre in area, and at the end of 1936, Filter No. 1 and Filter No. 4 had been operated forty-nine years, and Filter No. 9A, forty-six years. For the past eleven years, the sewage applied to these filters has passed through an Imhoff tank where some suspended solids have been removed. These three filters contain 5 feet in depth of sand of an effective size of .48, .04 and .17 millimeter, respectively. During the year these filters were operated at average rates of 49,300, 19,900 and 48,300 gallons per acre daily, respectively. The surfaces of Filters Nos. 1 and 9A are trenched and ridged late in the fall, while the surface of Filter No. 4 is permanently arranged in circular trenches, 14 inches wide, filled to a depth of 12 inches with coarse sand of an effective size of .48 millimeter. Sewage is applied to the trenches while grass is allowed to grow on the rest of the filter. Filter No. 639 is of the same size but contains only 2 feet of sand of an effective size of .22 millimeter over six inches of graded stone and gravel underdrains. The usual depth of sand used in filters is from 3⅓ to 5 feet, but it was thought worth while to ascertain the efficiency of a filter with only two feet of good sand. The effluent has been very turbid but contained about 5 parts per million of nitrates during the winter months and has had a relative stability of 50. Although this is not a high degree of purification there are conditions under which such a filter and effluent would be preferable to deeper filters of poor material which would not handle the required volume of sewage. These filters, because of lack of sewage as a result of the flood, were operated from January 1 to March 15 and from October

15 to December 31, 1936. A layer of silt several inches thick was deposited on the surface of these filters but apparently did not penetrate to any considerable depth. The average analyses are for the colder months and hence show considerably less purification than usual. These filters consist of sand in wooden tanks sunk in the ground. As stated, the tanks Nos. 1 and 4 are over forty-nine years old and the wood is badly decayed. Apparently most of the effluent from Filter No. 4 is finding its way into the ground and there are indications that some unpurified sewage is being short-circuited along the sides of the decayed tank to the underdrains of Filter No. 1. It is probable that the tanks will have to be reconstructed to give as good results as formerly.

Depth of Intermittent Sand Filters

There is no uniformity in the depth of sand of municipal and institutional filtration areas. Where the existing soil is merely underdrained, the depth is not of much importance from a standpoint of cost but where the sand has to be brought from a distance, the depth is an important consideration.

With this point in view, five filters have been operated during the past two years at the Experiment Station at a rate of about 76,800 gallons per acre daily. They are Nos. 636, 620, 621, 622 and 623 and contain 1, 2, 3, 4 and 5 feet in depth, respectively, of sand of an effective size of .25 millimeter. Nitrification is nearly the same in all except the shallowest, No. 636.

Under the conditions of this experiment there is no advantage in having a depth of sand greater than 3 feet. These filters are located indoors and the results are comparable with what might be expected of outdoor filters during the seven warmer months. The one- and two-foot filters give a remarkable amount of purification when the depth of sand is considered.

Underdrains in Intermittent Sand Filters

All the larger sand filtration areas in the State consist of material found in place and they are drained through lines of akron pipe laid with gravel-covered open joints.

In all the sand filters operated at the Experiment Station, underdrains consisting of 6 inches of graded gravel have been provided under the entire area of the filter in addition to akron pipe in the larger filters. If this construction is found to be advantageous, it can be used for all filters where the material is not found in place, but must be brought in.

To study this, two filters, Nos. 651 and 652, were started November 1, 1935. These are both 10 feet long, one foot wide and contain 4 feet in depth of sand with an effective size of .25 millimeter. They are intended to represent cross sections of an average muncipal bed, half-way between lines of underdrains, assuming that the parallel lines of underdrains are 20 feet apart. Filter No. 651 has no underdrains and Filter No. 652 is underlaid by 6 inches of graded stone and gravel.

The results of a year's operation show no advantage from underdrains when the filters are constructed of good sand. It is intended to repeat this experiment, using a finer sand similar to that used in Filters Nos. 643 to 649, inclusive.

Disposal of Sewage on Sand Areas by Leaching

The use of the term "filter" implies some means of collecting the effluent. At the new Massachusetts Military Reservation at Sandwich the contour of the land is such that the only practicable method of sewage disposal is by application to graded areas from which the surface soil has been stripped and by allowing the liquid portion to leach away. It is expected that for a month or two of each year there will be a large volume of comparatively weak sewage and for the rest of the year comparatively little sewage. Under these conditions it will be permissible to apply sewage at much higher rates than for continuous operation. To study the probable results of such operation, a small filter* filled to a depth of 10 feet with sand from the proposed area has been operated at the Experiment Station for six months at a rate of 300,000 gallons per acre daily. This is three times as great as a high, normal rate and equivalent to approximately three to six years' operation at the proposed plant. The effluent was well purified and unless there are impervious strata comparatively near the surface, this method of disposal should be satisfactory.

*No. 658.

Intermittent Sand Filters. — Effect of Different Size Sand
Average Analyses of Effluents

(Parts per Million)

Filter Number	Effective Size of Sand (Millimeter)	Quantity Applied: Gallons per Acre Daily	Temperature (Deg. F.)	Ammonia: Free	Ammonia: Albuminoid	Kjeldahl Nitrogen: Total	Kjeldahl Nitrogen: In Solution	Chlorides	Nitrogen As—: Nitrates	Nitrogen As—: Nitrites	Oxygen Consumed	B.O.D.	Fats	Alkalinity	Bacteria per Cubic Centimeter 4 Days—20°C.
Settled sewage	–	–	48	35.1	8.85	16	9.3	50	–	–	73.	513	33	–	4,800,000
1	.48	49,300	42	8.48	1.74	–	–	44	18.4	.030	14.	–	–	16	–
4	.04	19,900	41	.260	.227	–	–	46	20.0	.024	3.5	–	–	2	–
9A	.17	48,300	44	6.03	.850	–	–	37	15.8	.016	8.2	–	–	1	–
639	.22	48,300	43	21.4	4.08	–	–	45	7.25	.597	21.	–	–	110	–

Filters Nos. 1, 4 and 9A, 5 feet deep. Filter No. 639, 2 feet.

Intermittent Sand Filters. — Effect of Method of Dosing
Average Analyses of Effluents

(Parts per Million)

Filter Number	Number of Days Between Floodings	Effective Size of Sand (Millimeter)	Color	Ammonia: Free	Ammonia: Albuminoid	Kjeldahl Nitrogen: Total	Kjeldahl Nitrogen: In Solution	Chlorides	Nitrogen As—: Nitrates	Nitrogen As—: Nitrites	Oxygen Consumed	B.O.D.
Settled sewage	–	–	–	59.4	9.09	16	8.7	51	–	–	67.	247
593	1	.25	20	7.78	.522	–	–	51	47.1	.16	5.5	–
594	2	.25	13	8.81	.424	–	–	55	52.3	.06	4.4	–
595	3	.25	22	4.95	.579	–	–	55	34.2	.39	6.4	–
596	4	.25	21	5.02	.560	–	–	56	31.9	.62	5.5	–
597	5	.25	29	5.56	.700	–	–	56	22.9	.51	7.4	–
598	6	.25	38	4.67	1.27	–	–	52	15.0	.85	9.3	–
599	7	.25	57	8.84	.799	–	–	52	34.8	.30	7.9	–
600	1	.25	25	5.23	.479	–	–	54	43.5	.15	4.5	–
643	1	.15	18	5.89	.498	–	–	54	50.9	.17	4.7	–
644	2	.15	18	6.96	.492	–	–	56	46.6	.33	4.9	–
645	3	.15	24	5.64	.542	–	–	56	39.0	.38	6.3	–
646	4	.15	28	5.95	.770	–	–	57	28.3	.21	7.2	–
647	5	.15	230	41.5	1.71	–	–	56	7.1	.15	14.	–
648	6	.15	100	16.6	1.21	–	–	57	20.6	.13	10.	–
649	7	.15	102	22.2	1.37	–	–	56	18.5	1.0	12.	–

Intermittent Sand Filters. — Average Analyses of Effluents

(Parts per Million)

Filter Number	Depth (Feet)	Under-drains	Color	Ammonia: Free	Ammonia: Albuminoid	Chlorides	Nitrogen as—: Nitrates	Nitrogen as—: Nitrites	Oxygen Consumed
				Effect of Depth					
Settled sewage	–	–	–	35.1	8.85	50	–	–	73.
636	1	–	47	15.8	1.30	55	32.5	1.5	10.
620	2	–	34	6.21	.842	55	40.9	.75	8.7
621	3	–	19	5.95	.522	54	41.0	.28	4.8
622	4	–	22	8.69	.590	55	41.7	1.4	7.1
623	5	–	17	4.20	.381	55	43.5	.09	4.8
				Effect of Underdrains					
Settled sewage	–	–	–	35.1	8.85	50	–	–	73.
651	–	no	29	2.62	.540	64	49.0	.27	6.0
652	–	yes	28	1.87	.608	61	47.7	.17	5.7
658	–	leaching	50	1.87	.847	62	45.4	.50	7.7

Effective size of sand .25 millimeter.

Rates of Operation of Sand Filters

Filter Number	Gallons per Acre Daily	Per Cent of Time Filter was covered with Sewage
593	105,600	0
594	105,600	0
595	105,600	0
596	105,600	0
597	105,600	0
598	105,600	0
599	105,600	0
600	97,400	8
636	76,800	0
620	76,800	0
621	76,800	0
622	76,800	0
623	76,800	0
643	105,600	0
644	105,600	0
645	71,000	27
646	105,600	0
647	55,500	47
648	82,200	16
649	71,000	30

Trickling Filters

In 1890, an intermittent filter of coarse gravel was operated at the Experiment Station. This was the forerunner of the present trickling filter, and was probably the first filter of this type anywhere. Since then, there has always been a number of these filters in operation at the Experiment Station for the study of various problems.

In connection with the present discussions of the need of aeration of high rate trickling filters, it is of interest to note that in 1892 two trickling filters at the Experiment Station were aerated by drawing air down through them. At the rates at which these filters were operated, a million gallons per acre daily or less, aeration was unnecessary. In 1901 analyses of air from the interior of trickling filters which were operating satisfactorily showed an oxygen content of from 0.3 to 5 per cent. Apparently a small percentage of oxygen in the air in a trickling filter is sufficient to maintain aerobic conditions.

The trickling filter longest in use at the Experiment Station, No. 135, has been in operation thirty-seven years and is constructed of walnut-size crushed stone 10 feet in depth. This size stone has been found to be rather small for practical use and while this filter has given a very good effluent, there has been a tendency toward clogging of the upper portion.

Four other filters, Nos. 452 to 455, inclusive, contain 4, 6, 8 and 10 feet in depth, respectively, of crushed stone that will pass a 1½-inch screen and be retained by a ¾-inch screen. These filters were operated to show the greater efficiency of deeper filters. For each foot in depth of material, they have filtered 200,000, 264,000, 359,000 and 410,000 gallons of sewage per acre daily, respectively. Filter No. 475 contains 10 feet in depth of stone passing a 2½-inch screen and retained by a 1½-inch screen. Considering the increased dosage with the increased depth of filter, their effluents have been of approximately the same quality.

Filters Nos. 571, 572 and 573 are identical in construction. Each is 1/20,000 of an acre in area and contains 10 feet in depth of crushed stone that will pass a 1½-inch screen and be retained by a ¾-inch screen. During 1936, the average rate of operation was 1,500,000 gallons per acre daily. At depths of 4, 6 and 8 feet, half-round sections of ¾-inch iron pipe are inserted to the center of the filters to collect small portions of the liquid passing through the filter. During 1936, samples were collected at different depths from Filter No. 571 only. The results of the analyses show progressive purification down through the filter.

Analyses of trickling filter effluents at the Experiment Station have always been made on the effluents as they came from the filters without any settling. Irregularities in unloading affect determinations such as oxygen consumed, B.O.D. and relative stability, and interfere with the comparison of the results of a series of

filters. In 1937 it is intended to make analyses on all effluents after one hour settling.

The three filters, Nos. 571, 572 and 573, have been operated mainly to study the value of various forms of pre-treatment of sewage applied to trickling filters. Filter No. 571 was operated as a control. The sewage applied to Filter No. 572 received five grains per gallon of ferric sulphate. The sewage applied to Filter No. 573 was stored in a conical bottom tank, and a jet of air was blown through the sewage continuously, giving an average dissolved oxygen content of 6.1 parts per million. Sludge was drained from this tank daily so that there was very little, if any, clarification from an activated sludge effect. Of the three filters, the effluent of No. 572 receiving the ferric sulphate was slightly the best, the soluble albuminoid ammonia and B.O.D. being the lowest and the nitrates and relative stability the highest. The effluent of No. 573 receiving aerated sewage was the second best.

The operation of the filters was interrupted by the flood so that they have been on this schedule for only about five months, too short a time for definite conclusions.

Average Analyses
Effluents from Trickling Filters
(Parts per Million)

Filter Number	Depth (Feet)	Size of Stone (Inches)	Quantity Applied: Gallons per Acre Daily	Ammonia: Free	Ammonia: Albuminoid: Total	Ammonia: Albuminoid: In Solution	Kjeldahl Nitrogen	Chlorides	Nitrogen as—: Nitrates	Nitrogen as—: Nitrites	Oxygen Consumed	B. O. D.	Relative Stability
Settled sewage	–	–	–	35.1	8.85	5.23	16.	50	–	–	73	513	–
135	10	walnut	1,500,000	24.4	4.29	2.57	7.8	50	14.3	.39	35	87	72
452	4	¾–1½	800,000	18.2	4.35	2.23	7.2	49	10.0	.47	24	78	74
453	6	¾–1½	1,583,000	16.5	4.65	1.77	8.2	50	10.2	.24	26	42	91
454	8	¾–1½	2,873,000	21.3	5.10	1.94	8.9	49	5.36	.58	25	69	81
455	10	¾–1½	4,104,000	22.4	4.29	2.44	7.9	50	5.55	.25	26	48	83
475	10	1½–2½	3,000,000	22.3	6.21	3.02	11.	49	8.75	.35	28	70	46

Average Analyses of Effluents from Trickling Filters collected at Different Depths
(Parts per Million)

Depth (Feet)	Ammonia: Free	Ammonia: Albuminoid: Total	Ammonia: Albuminoid: In Solution	Kjeldahl Nitrogen	Chlorides	Nitrogen as—: Nitrates	Nitrogen as—: Nitrites	Oxygen Consumed	B.O.D.	Relative Stability
Settled Sewage										
–	35.1	8.85	5.23	16.	50	–	–	73	513	–
Filter No. 571 (control)										
4	26.3	6.58	3.71	12.	46	1.22	.25	39	190	29
6	23.8	6.12	3.08	11.	48	2.90	.10	29	152	29
8	20.6	5.76	2.39	10.	47	7.66	.20	27	125	60
10	20.8	5.29	2.16	10.	49	11.2	.47	27	86	63
Filter No. 572 (settled sewage coagulated with 5 g.p.g. ferric sulphate)										
10	20.1	3.90	2.10	6.9	50	16.0	.31	24	61	98
Filter No. 573 (settled sewage aerated)										
10	16.4	5.36	2.56	9.0	50	14.5	.33	28	87	89

Average Solids
Effluents from Trickling Filters
(Parts per Million)

Filter Number	Depth (Feet)	Unfiltered			*In Suspension		
		Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed
Settled sewage	–	–	–	–	**177	153	24
135	10	407	168	239	63	42	21
452	4	439	191	248	106	65	41
453	6	447	199	248	122	79	43
454	8	393	162	231	79	56	23
455	10	466	219	247	68	41	27
475	10	469	225	244	88	56	32
571	10	410	184	226	76	52	24
572	10	423	175	248	58	35	23
573	10	410	169	241	91	58	33

*By filter paper. **By Gooch crucible.

Trickling Filters Operated at Very High Rates

In the operation of all types of sewage filters, it has been the general practice to get as much purification and nitrification as practicable. In some places the discharge of effluents containing high nitrates may cause trouble from excessive growths of plants or organisms in the body of water receiving the effluents. There is a growing tendency toward the development of processes of partial purification to meet special cases where a high degree of purification is not needed. The revival of interest in chemical precipitation is a result of this tendency. Another line of investigation with the same object in view has been the development of very high rates in trickling filters. Rates as high as 20,000,000 gallons per acre daily have been employed. In one instance, 20 per cent or more of such an effluent has been refiltered along with the newly applied sewage, as it is claimed that this increases the net purification.

It is very probable that under the most favorable conditions and in a given length of time, the organisms in the contact material of a trickling filter can bring about only a definite maximum amount of chemical changes in the sewage which is in contact with them. Assuming that these conditions exist at all rates of filtration, then as the rate increases, the degree of purification decreases proportionately. In many instances this partial purification is all that is needed. A number of investigators are working along these lines, and it has become customary to express the purification resulting from these high rates of filtration in terms of B.O.D. reduction. This is apt to be misleading. Some might expect that if the B.O.D. were reduced 60 per cent the increased relative stability would be something of the same order, but this of course does not follow. Filters Nos. 640 and 650, to be mentioned later, gave a B.O.D. reduction of 67 and 57 per cent, respectively, yet the relative stability was only 15 and 11, respectively.

Primarily, the 5-day B.O.D. determination is a measure of the oxidation of carbonaceous matter. Of course, reduction of the B.O.D. is of value because it relieves the load on the dissolved oxygen content of a body of water into which such an effluent is discharged. The per cent reduction of B.O.D. does not show anything about stability or changes in the nitrogenous portion of the effluent.

Up to the year 1935, the highest rate at which a trickling filter had been operated at the Lawrence Experiment Station was about 10,000,000 gallons per acre daily. The sewage applied to this filter had been well clarified and somewhat purified by aeration in a tank containing roofing slate. The filter effluent was well nitrified and perfectly stable.

In May, 1935, a small trickling filter was started to permit a study of the amount of purification obtainable at high rates. This filter, No. 640, was 6 inches in diameter and contained 10 feet in depth of crushed stone passing a 1½-inch screen and retained on a ¾-inch screen. It was started at a rate of 2,200,000 gallons per acre daily and this rate was gradually increased to 17,800,000 gallons by August 1. Twenty per cent of the effluent was refiltered. The sewage and effluent were stored in separate tanks and applied to the filter separately but at the same time. By August 15 the filter became clogged and the upper foot of stone was removed,

washed and replaced; by October 15, it again became clogged and all the material was then removed and replaced with crushed stone passing a 2½-inch screen and retained by a 1½-inch screen. Apparently the clogging was caused by a deposit on the stones similar to a sewage slime which did not slough off as is the case with coatings on the stone of a normally operated trickling filter. Since the larger stones were used, no clogging has been apparent.

On October 25 a duplicate of Filter No. 640 was placed in use. Operation of this filter, No. 650, was started at a rate of 17,800,000 gallons per acre daily. It was operated in the same manner as Filter No. 640, except that no effluent was refiltered. At the end of 1936, Filter No. 640 had been operated ten months at the high rate and Filter No. 650, seven months. The two filters were out of operation nearly seven months in 1936 because the sewage supply was cut off by the flood.

From the average analyses it appears that the return of part of the effluents aided slightly in purification. For Filters Nos. 640 and 650, the B.O.D. reduction was 67 and 57 per cent, respectively; the reduction in oxygen consumed, 65 and 59 per cent, respectively; and total Kjeldahl nitrogen, 47 and 33 per cent, respectively. There was only a very small amount of suspended solids, because the filters did not unload.

Trickling Filters operated at Very High Rates
Average Analyses
(Parts per Million)

	Ammonia			Kjeldahl Nitrogen		Chlorides	Nitrogen as—		Oxygen Consumed	Relative Stability	B. O. D.
		Albuminoid									
	Free	Total	In Solution	Total	In Solution		Nitrates	Nitrites			
Settled sewage*	33.9	8.38	4.81	15.	8.5	52	–	–	68	–	316
Effluent from:											
Filter No. 640	26.1	4.44	2.78	8.0	5.1	52	.568	.11	24	15	106
Filter No. 650	22.8	5.53	3.25	10.	5.9	48	.584	.07	28	11	136

* Settled sewage applied to Trickling Filters Nos. 640 and 650.

Biochemical Oxygen Demand of River Water

The 5-day B.O.D. and dissolved oxygen of the Merrimack River were determined monthly from June to November, inclusive, at the same stations as during the seven previous years. There is a slight variation in the B.O.D. determinations at the different stations but the same general relation holds from year to year.

Average Analyses of Merrimack River Water

Station	B.O.D. (Parts per Million)	Dissolved Oxygen Per Cent of Saturation
At Tyngsborough	2.6	89.9
Above Lowell	2.5	95.0
Below Lowell	3.8	83.3
Above Lawrence	3.7	81.4
Below Lawrence	14.0	59.5
Above Haverhill	4.6	81.5
At Groveland	6.5	46.3
Above Amesbury	4.4	59.5
Above Newburyport	4.5	56.5

Purification of Polluted Surface Water by Storage

The study of the effect of storage in the purification of water, begun in 1930, has been continued. Two covered concrete tanks, 16 feet in diameter and with an effective depth of 3 feet 9 inches, are used. A small door in each tank allows diffused light to enter during the warmer months but during the winter the doors are closed. The first tank is divided by concrete walls into three sectors, one about as large as the other two. The second tank is divided into four equal sectors. These seven compartments are connected in series, the inlet in each case being at the bottom

and the outlet near the top. Merrimack River water is passed continuously into the first compartment at such a rate that the total detention period is thirty days. Probably because of the absence of direct sunlight practically no color reduction resulted during this period of storage, the average color for the past six years of the river water entering the tank being 43 parts per million, and the color after storage, 41. Bacteria of the coli-aerogenes group were reduced 99.58 per cent, and of the 20° C. bacteria, 97.68 per cent was removed. Storage removed practically all suspended matter and reduced the free, total and soluble albuminoid ammonia.

Merrimack River water for this and other experiments is taken from the North Canal and flows by gravity through a 2½-inch pipe laid soon after the establishment of the Experiment Station. This pipe had become coated with iron deposits, with probably some silt, which reduced the number of bacteria in the water flowing through it. It has long been known that the number of bacteria in the water applied to experimental filters was lower than in the samples collected directly from the canal. In October a new 3-inch pipe was installed which provided water of the same bacterial content as the canal itself. It is not anticipated that this change will materially affect the percentage of purification in the storage tank but the actual number of bacteria in the stored water will undoubtedly be higher.

A sand filter, No. 577, was operated at a rate of 2,500,000 gallons per acre daily with the stored water, and a duplicate filter, No. 576, was operated with river water such as entered the storage tank. Both of these filters contain 4 feet in depth of sand with an effective size of .25 millimeter. The low bacterial efficiency of the filter receiving the stored water is typical of the results obtained when a water free from suspended or easily coagulable matter is filtered through a slow sand filter.

Storage of Merrimack River Water. — Effect on Filtration
Average Chemical Analyses
(Parts per Million)

	Color	Ammonia			Chlorides	Nitrogen as—		Oxygen Consumed	Hardness
		Free	Albuminoid						
			Total	In Solution		Nitrates	Nitrites		
Filter No. 576:									
Raw river water applied to	41	.170	.245	.196	4.8	.304	.006	6.1	14
Effluent from	25	.038	.127	–	4.8	.457	.003	4.6	15
Filter No. 577:									
Stored river water applied to	40	.077	.188	.165	4.7	.367	.009	5.0	24
Effluent from	35	.031	.157	–	4.7	.444	.001	4.7	25

Purification of Merrimack River Water by Storage
Average Bacterial Analyses — 1936

	Bacteria per Cubic Centimeter			Coli-Aerogenes Group in 100 c.c.
	4 Days 20°C.	24 Hrs.—37°C.		
		Total	Red	
River water before storage	15,100	220	90	6,700
River water after 30 days' storage	350	12	2	28
Effluent from Filter No. 576*	360	32	6	60
Effluent from Filter No. 577**	190	10	1	14

*Raw water applied. **Stored water applied.

Purification of Merrimack River Water by Storage, 1931–1936

	Number of Days' Storage	Coli-Aerogenes Group in 100 c.c.	
		Raw Water	Stored Water
1931 (first period)	25	750	11
1931 (second period)	45	2,500	0.5
1932	45	1,320	2
1933	30	2,900	7
1934	30	4,200	8
1935	30	2,200	23
1936	30	6,700	28

Lawrence City Filters

As has been the custom for the past forty-three years, the Lawrence Experiment Station staff maintained during 1936 a general oversight of the operation and the bacterial efficiency of the Lawrence city filters. The chlorine plant was inspected and bacterial examinations of samples of the water before and after filtration were made almost every day.

The water supply of the city of Lawrence has been taken from the Merrimack River since 1875. Since 1893 the water taken from the river has been filtered and since 1918 the filtered water has been treated with chlorine as an added measure of safety. Three filters are in use. The oldest filter, 2.2 acres in area, is divided into three sections, one of which is covered; the second, a covered filter, 0.75 of an acre in area, was built in 1907; the third filter, also covered, was completed early in 1926 and is 0.75 of an acre in area. The average volume of water filtered during 1936 was 4,842,000 gallons a day. Liquid chlorine was applied to the filtered water as a solution in the pump-well at the average rate of 1.63 parts per million and no attempt was made to maintain any definite residual chlorine. It is seldom necessary to change the rate of chlorination. Daily samples for bacterial examination are collected after chlorination and the amount of chlorine to be added is governed by the results of these examinations. This amount of chlorine is very high as compared with that used in many supplies but is no higher than has been found to be necessary to treat adequately the water of the Merrimack River even after filtration through slow sand filters. The chlorinated water is pumped direct to an open storage reservoir holding about 41,500,000 gallons, from which the greater part of the city is supplied by the low service system. This arrangement permits a larger residual chlorine than if the water were pumped directly into the distribution system. In 1931 an electrically driven pump was installed to supply water for the high service system from the reservoir. The bacterial efficiency of the various filters has averaged better than 99 per cent but the coli-aerogenes index, or the number of bacteria of the coli-aerogenes group in 100 cubic centimeters, is still higher than now allowed under the U. S. Treasury Department standard. After chlorination, however, the average number is less than one, and is well within the standard. There has been some increase in the 20° C. bacteria count in the water of the storage reservoir, partly because of an "after growth" following chlorination and partly because of contamination by dust. When the last covered filter was built, 1926, Venturi meters were installed on all filters except the west covered, the only filter from which it is impossible to collect samples. For some time these meters have been inaccurate and late in the year they were removed entirely. The rate of pumpage is measured by a Venturi meter on the forcemain.

During the March flood all the filters and the pump-well were submerged and the motors had to be hoisted above the pumps. Emergency connections were made with North Andover, Andover, Methuen and Salem, N. H., and by a very narrow margin the supply was maintained until the Lawrence filters were reconditioned. About this time the daily water consumption jumped nearly three million gallons. Most of this was found later to be due to an open joint and a plug blown from a dead-end line in a mill yard, on account of the settlement of the mains caused by the flood. After six days, when the river had gone down sufficiently, the walls of the pump-well were washed down with a chlorine solution, the well heavily chlorinated and the pumps started. The heavy deposit of silt which covered the filters greatly reduced their capacity. Fire engines were used to hasten the lowering of the water on the surface of the west covered filter so that the silt could be removed. As soon as this was done the filter was put back in service and each of the filters was then cleaned in turn. Even when all the filters had been cleaned the water obtainable was still far below the normal output. This was due partly to incomplete removal of the silt and partly to the packing of the sand by the use of trucks on the open filters and by the unusual number of laborers walking around on the filters. After several cleanings, the filters approached their normal output.

During all this period the bacterial efficiency of the filters was very low. For some time after the pumps were started a residual chlorine of 1.5 to 2.0 parts per million was maintained. This was gradually lowered to 1.0 to 1.5. For twelve days residual chlorine tests were made every fifteen minutes on the water as it left the

pumps. As a result of the heavy and carefully controlled chlorination, of one hundred twenty-five 10 cubic centimeter portions tested for coli-aerogenes during this time, only one was found positive. There was little, if any, complaint of chlorine tastes.

For many years it has been the custom once a month in collecting chemical samples to take only one sample from the three units of the old east filter. Since the rehabilitation of the filters, samples have been collected from each unit separately, from the North Filter, and the river, three times monthly, in addition to samples collected once a month as formerly.

As a direct result of the experiences during the flood, a rapid sand filter, to be used as a preliminary filter in combination with the slow sand filters, is under construction. This will be located at a higher level so as to be entirely safe in future floods.

Average Bacterial Analyses of Water collected in connection with the Lawrence City Filters

Source of Sample	Bacteria per Cubic Centimeter			Per Cent of Bacteria Removed			Coli-Aerogenes Group in 100 cc.
	4 Days 20°C.	24 Hrs.—37°C. Total	24 Hrs.—37°C. Red	4 Days 20°C.	24 Hrs.—37°C. Total	24 Hrs.—37°C. Red	
Merrimack River	14,800	580	220	–	–	–	10,900
Old East Filter — East Covered Section	120	7	1	99.2	98.8	99.5	33
Old East Filter — East Open Section	140	7	1	99.1	98.8	99.5	24
Old East Filter — West Open Section	110	6	1	99.3	99.0	99.5	25
North Covered Filter	190	8	2	98.7	98.6	99.1	55
All Filters after Chlorine Treatment	17	3	0	99.9	99.5	100.0	–*
Outlet from Distributing Reservoir	190	13	0	98.7	97.8	100.0	–*
Tap at City Hall	200	11	0	98.6	98.1	100.0	–*
Tap at Experiment Station	140	8	0	99.1	98.6	100.0	1
High Service System	140	8	0	99.1	98.6	100.0	–*

* Less than 1.

Average Chemical Analyses of Water collected in connection with the Lawrence City Filters

(Parts per Million)

Source of Sample	Color	Ammonia Free	Ammonia Albuminoid	Chlorides	Nitrogen As — Nitrates	Oxygen Consumed	Iron	Manganese	Hardness
Merrimack River	37	.205	.275	4.4	.167	6.4	.52	.02	12
Old East Filter (three sections)	36	.200	.111	4.5	.254	4.4	1.07	.11	15
East Covered Section	40	.165	.121	5.1	.248	4.9	.93	.13	13
East Open Section	58	.238	.106	5.5	.304	4.6	.89	.14	18
West Open Section	31	.102	.106	5.0	.244	4.9	.59	.09	15
North Covered Filter	26	.038	.118	4.6	.226	4.6	.29	.09	14
Outlet of Distributing Reservoir	39	.130	.124	6.8	.266	4.0	.82	.08	13
Tap at City Hall	35	.075	.125	6.4	.266	4.1	.77	.02	12
Tap at Experiment Station	36	.071	.124	6.3	.263	3.8	.78	.05	15

Average Solids in Samples of Water collected in connection with the Lawrence City Filters

(Parts per Million)

Source of Sample	Unfiltered			In Suspension		
	Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed
Merrimack River	68	26	42	10	3	7
Old East Filter (three sections)	60	22	38	–	–	–
East Covered Section	66	23	43	–	–	–
East Open Section	67	23	44	–	–	–
West Open Section	60	21	39	–	–	–
North Covered Filter	57	21	36	–	–	–
Outlet of Distributing Reservoir	60	23	37	–	–	–
Tap at City Hall	59	21	38	–	–	–
Tap at Experiment Station	59	21	38	–	–	–

Viability of Sewage Organisms in Salt Water

In studies made on quahogs in sewage-polluted sea water, it was found that in 48 hours practically all of the members of the coli-aerogenes group had disappeared from the sea water and none were found in the quahogs. To see if this disappearance was due to the sea water alone, or to action of both the water and the quahogs, experiments were carried out using the sea water in the absence of quahogs.

Domestic sewage was added to sea water and, for purposes of comparison, to Lawrence tap water in amounts of ½ per cent, 1 per cent, and 1½ per cent, and kept, shielded from direct sunlight, at temperatures varying from 50° to 70° F. The sewage alone and the unpolluted sea water were kept under the same conditions. Analyses were made after 1, 2 and 4 days. As shown in the following table, the number of bacteria, especially the members of the coli-aerogenes group, decreased very slowly in the sewage and in the tap-water mixture. In the sea-water mixture the numbers dropped much more rapidly.

Viability of Sewage Bacteria in Sea Water

	Bacteria per Cubic Centimeter			B. Coli per Cubic Centimeter
	4 Days 20°C.	24 Hours—37°C.		
		Total	Red	
Sewage:				
At start	1,200,000	270,000	130,000	20,000
After 24 hours	2,200,000	340,000	195,000	10,000
After 48 hours	1,000,000	120,000	50,000	10,000
After 96 hours	1,800,000	22,000	9,000	5,000
Sea water:				
At start	340	1	0	0
After 24 hours	400	1	0	0
After 48 hours	590	1	0	0
After 96 hours	480	1	0	0
Tap water, with ½ per cent sewage:				
At start	48,000	1,800	800	500
After 24 hours	380,000	1,400	600	500
After 48 hours	180,000	1,600	1,000	1,000
After 96 hours	26,000	850	420	500
Tap water, with 1 per cent sewage:				
At start	84,000	2,700	1,200	1,000
After 24 hours	480,000	2,500	1,400	500
After 48 hours	270,000	1,800	1,100	1,000
After 96 hours	21,000	1,300	900	1,000
Tap water, with 1½ per cent sewage:				
At start	120,000	3,800	2,400	2,000
After 24 hours	230,000	3,100	1,900	1,000
After 48 hours	260,000	2,800	1,200	1,000
After 96 hours	16,000	1,100	630	1,000
Sea water, with ½ per cent sewage:				
At start	12,000	1,400	400	100
After 24 hours	2,500	110	40	100
After 48 hours	2,400	110	50	20
After 96 hours	2,000	8	1	0[1]
Sea water, with 1 per cent sewage:				
At start	22,000	2,100	700	500
After 24 hours	4,000	140	70	100
After 48 hours	3,300	150	60	20
After 96 hours	1,800	5	0	0[1]
Sea water, with 1½ per cent sewage:				
At start	36,000	4,000	1,400	1,000
After 24 hours	3,200	180	90	100
After 48 hours	3,900	130	60	50
After 96 hours	2,300	6	1	0[1]

[1] B. Coli present in 10 c.c.

It was evident from a comparison of the analyses that there is an immediate reduction of the number of bacteria by the sea water. In order to determine the effect of salt water on bacteria of sewage in shorter periods of contact, experiments were made on samples of settled sewage from Moon Island and raw sewage from Calf Pasture Pumping Station. The results indicate that on discharging sewage into salt water a reduction of about 33 per cent in the number of bacteria as determined by the 4-day count at 20°C. may be expected in 15 minutes and about 50 per cent in 1 hour. At 37° C. the reductions were about 18 per cent in 15 minutes and 27 per cent in 60 minutes. The results are shown in the following table:

Viability of Sewage Bacteria in Sea Water

	IN RIVER WATER				IN SALT WATER			
	Bacteria per Cubic Centimeter				Bacteria per Cubic Centimeter			
	20° C. 4 Days	24 hours—37° c.		Coli-Aerogenes in 1 c.c	20° C. 4 Days	24 hours—37° c.		Coli-Aerogenes in 1 c c
		Total	Red			Total	Red	
1 per cent sewage, Deer Island:								
River water	5,700	240	130	100	–	–	–	–
Sea water	–	–	–	–	350	18	0	0.1
Sewage	6,000,000	2,000,000	980,000	1,000,000	–	–	–	–
Start	180,000	34,000	26,000	10,000	150,000	29,000	23,000	10,000
15 minutes	160,000	31,000	19,000	10,000	93,000	24,000	15,000	10,000
30 minutes	120,000	15,000	11,000	10,000	84,000	19,000	7,700	10,000
60 minutes	93,000	15,000	12,000	10,000	77,000	18,000	11,000	10,000
4 hours	99,000	21,000	12,000	10,000	98,000	17,000	6,300	1,000
24 hours	34,000	16,000	8,400	1,000	18,000	17,000	8,300	1,000
3 days	9,000	1,400	1,000	100	270,000	100,000	60,000	100
1½ per cent sewage, Deer Island:								
Start	42,000	19,000	13,000	10,000	45,000	12,000	9,800	10,000
15 minutes	37,000	14,000	11,000	1,000	30,000	11,000	7,800	1,000
30 minutes	35,000	12,000	9,200	100	29,000	11,000	7,700	1,000
60 minutes	41,000	11,000	8,400	10,000	24,000	12,000	9,000	1,000
4 hours	21,000	11,000	9,100	1,000	22,000	11,000	8,600	10,000
24 hours	67,000	2,900	2,300	1,000	59,000	2,100	1,600	100

Viability of Sewage Bacteria in Sea Water—Concluded

½ per cent sewage, Calf Pasture:								
River water	28,000	1,600	310	100	–	–	–	–
Salt water	–	–	–	–	90	3	0	0
Sewage	6,200,000	1,600,000	1,100,000	100,000	–	–	–	–
Start	120,000	9,800	5,600	1,000	65,000	6,600	3,900	1,000
15 minutes	115,000	5,000	3,100	1,000	44,000	4,800	3,100	1,000
30 minutes	95,000	4,400	3,000	1,000	29,000	4,000	2,400	1,000
60 minutes	91,000	4,900	2,900	1,000	20,000	2,800	1,500	1,000
4 hours	110,000	3,100	2,100	1,000	17,000	3,400	1,000	100
1 per cent sewage, Calf Pasture:								
River water	16,000	1,200	420	100	–	–	–	–
Salt water	–	–	–	–	90	3	0	0
Sewage	5,500,000	1,750,000	1,050,000	100,000	–	–	–	–
Start	125,000	16,000	11,000	1,000	48,000	12,000	6,500	1,000
15 minutes	84,000	13,000	6,300	1,000	56,000	9,600	7,000	1,000
30 minutes	77,000	12,000	9,000	1,000	40,000	11,000	7,000	1,000
60 minutes	100,000	14,000	8,500	1,000	31,000	8,400	6,200	1,000
4 hours	105,000	12,000	5,100	1,000	27,000	3,600	1,900	1,000
24 hours	120,000	6,800	4,000	1,000	250,000	15,000	2,700	100
1½ per cent sewage, Calf Pasture:								
River water	18,000	650	190	100	–	–	–	–
Salt water	–	–	–	–	550	12	0	0
Sewage	5,500,000	850,000	670,000	100,000	–	–	–	–
Start	120,000	13,000	9,800	1,000	120,000	12,000	8,600	1,000
15 minutes	91,000	16,000	9,200	1,000	52,000	9,800	6,800	1,000
30 minutes	99,000	11,000	7,700	1,000	44,000	11,000	7,400	1,000
60 minutes	84,000	14,000	9,800	1,000	78,000	11,000	6,800	100
4 hours	98,000	11,000	4,300	1,000	41,000	3,900	2,400	1,000
24 hours	220,000	12,000	5,200	100	160,000	3,500	2,400	100

Growth of Bacteria in Jute used in Calking Joints

The failure to remove coli-aerogenes from new mains by heavy chlorination led to the search for the origin of these bacteria in some other source than accidental contamination of the pipe during the process of laying.

The most likely source seemed to be in the rope used in calking the joints. A preliminary examination of a number of samples of jute rope showed the presence of members of the coli-aerogenes group in numbers ranging from 10 to 1,000 per gram of jute.

The procedure followed in the bacterial examination of jute samples was to place one gram of sample in a bottle containing 100 cubic centimeters of sterile water and shake thoroughly. Bacterial counts are expressed in terms of one gram of the sample. After portions of the water had been taken for analysis to show the bacterial content of the jute, the bottle containing the jute and the water was allowed to stand at 70° F. This temperature was selected as a convenient one and is about the summer temperature of surface waters in water mains. Daily tests were made, usually for twelve or more days. At 70°F. the numbers of bacteria of all types increased enormously. The numbers of bacteria in sixteen samples of jute as received and after standing in water for three days are shown in Tables Nos. 1 and 2. The period of three days was selected as by this time the numbers had reached approximately the maximum, and later results were somewhat irregular. In Table No. 3, the daily results shown for one sample are representative of all except tarred samples.

The enormous growths of bacteria in the jute and water mixtures show plainly that the jute contains food material for the bacteria. Ten grams of jute No. 1 were placed in three liters of distilled water and allowed to stand 24 hours at 70°F. The soluble matter was found to be equal to 2.79 per cent of the jute and contained 1.83 per cent organic nitrogen and no fermentable sugar.

In another test a portion of the jute was placed in distilled water, brought to a boil, and boiled five minutes. After cooling, the water was decanted and replaced with fresh water and boiled again. This was repeated until the jute had been boiled ten times. By this time most of the soluble matter had been removed but small amounts of organic matter would probably still have dissolved if the boiling had been continued indefinitely. By this treatment 4.46 per cent of the jute was rendered soluble. The organic nitrogen content of the soluble matter was 1.58 per cent. Some of this extract was concentrated to one-fourth of its volume and used instead of peptone and meat extract in making nutrient agar. The counts on plates made with this agar averaged nearly as high as with regular agar, proving that organic matter in the jute is suitable for bacterial growth.

Table No. 4 shows the results of some tests made with this boiled and dried jute and with jute that had been held in an autoclave 15 minutes at 15 pounds pressure. Tests showed that the autoclaved jute was completely sterile. The removal of most of the soluble matter by boiling reduced the ability of the jute to support a heavy bacterial growth. When polluted water was added to sterile jute and the mixture allowed to stand, a large increase in the number of bacteria resulted.

Some of the jute samples were loosely twisted rope and some in a hard braided form.

To show the effect of chlorination in sterilizing jute the following tests were made. Ten-gram pieces of the braided jute were placed in a liter of water containing 10 parts per million chlorine added as hypochlorite and allowed to stand at 70°F. Additional chlorine was added from time to time to maintain 10 parts per million.

The results in Table No. 5 show that two weeks' contact was insufficient for sterilization, although the number of coli-aerogenes was reduced. When the chlorine solution was rinsed from the jute, it was allowed to stand in sterile water for three days and the portions which had the longest contact with chlorine showed the lowest number of bacteria. This is probably due to the fact that more of their food supply had leached out into the chlorine solution.

This series of tests illustrates the difficulty in sterilizing any jute in pipe joints that may be in contact with the water in the pipe. The incomplete sterilizing action of the chlorine is undoubtedly due to the inability of the chlorine solution to reach the interior portions of the rope before its strength is exhausted. When the

jute is unbraided and the strands laid open, coli-aerogenes are completely removed in one day's contact.

In another test some sterile autoclaved jute was placed in sterile water, inoculated with a pure culture of Eberthella typhosa and kept at 70°F. Counts made on Bismuth sulphite agar showed an increase in numbers, and although the rate of increase was somewhat lower than with coli-aerogenes, a maximum of 23,000,000 per gram of jute was reached. This shows that pathogenic bacteria, such as typhoid, can grow on jute under favorable conditions. (Table No. 6.)

Besides the 11 samples of untreated jute, shown in Table No. 1, four samples of tarred jute have been examined. Three of these showed no coli-aerogenes even after standing three days but one did show a large number after standing six days. A sample of waxed jute showed no coli-aerogenes even after six days and a sample of oiled jute behaved about the same as untreated jute. Thorough tarring of jute seems to solve the coli-aerogenes problem but its use would probably be undesirable with chlorinated waters.

These tests show that jute carries food material for bacteria, and that when any jute in the joints of water pipe is exposed to contact with the water, bacteria increase in numbers and spread into the water in the main. It is not intended to claim that the growths of bacteria obtained in the laboratory tests duplicate conditions in the mains where an uncertain amount of surface is exposed to the water and the jute is very densely packed. It has been shown that of 11 samples of untreated jute examined, all contained coli-aerogenes, and all gave enormous increases in the number of coli-aerogenes when in contact with water for three days or more. Steam-sterilized jute in contact with a coli-aerogenes free water will develop no coli-aerogenes, but in contact with a polluted water may become infected.

In sterilizing jute by steam, conditions must be such that moist steam penetrates thoroughly into the rope or braids. A thorough boiling of jute should kill all coli-aerogenes and cut down the food supply for all bacteria.

In all the 11 untreated jutes examined, both B. coli and B. aerogenes were isolated. No definite statement can be made as to the sanitary significance of the coli-aerogenes in jute other than to say that for the present they must be considered on the same basis as coli-aerogenes from any other source.

The tables referred to above are as follows:

TABLE 1. — *Jute as Received*

1 Gram in 100 Cubic Centimeters of Sterile Water

Jute No.	At Start				After 3 Days at 70°F.			
	Bacteria per Gram of Jute			Coli-Aerogenes per Gram	Bacteria per Gram of Jute*			Coli-Aerogenes per Gram*
	4 Days 20°C.	24 Hours—37°C.			4 Days 20°C.	24 Hours—37°C.		
		Total	Red			Total	Red	
Untreated:								
1.	–	–	–	10	–	–	–	10,000
2.	–	–	–	10	–	–	–	10,000
2.	110,000	26,000	500	10	180,000	230,000	45,000	10,000
3.	–	–	–	10	–	–	–	1,000
4.	220,000	26,000	1,500	1,000	1,400,000	650,000	230,000	100,000
5.	250,000	57,000	1,000	1,000	1,000,000	710,000	45,000	10,000
6.	4,600,000	76,000	19,000	1,000	3,500,000	18,000	400	10
8.	175,000	17,000	100	100	450,000	80,000	20,000	10,000
10.	210,000	69,000	23,000	1,000	4,600,000	560,000	150,000	100,000
13.	760,000	140,000	40,000	100	4,800,000	1,400,000	250,000	100,000
14.	2,800,000	280,000	20,000	1,000	4,300,000	770,000	210,000	100,000

*Multiply by 1,000.

TABLE 2. — *Jute as Received*

Tarred:								
7.	1,800,000	21,000	0	0	20,000	120	5	0
9.	12,000	1,200	100	0	1,500	5	0	0
12.	630,000	900	0	0	550	1	0	0
16.	9,000	5,400	0	0	20,000	3,600	0	0
16.†	–	–	–	–	920,000	650,000	120,000	10,000
Waxed:								
11.	5,000	1,100	300	0	3,200	20	13	0
Oiled:								
15.	690,000	200,000	33,000	1,000	4,700,000	1,600,000	450,000	100,000

†After 6 days.

TABLE 3. — *Braided Jute No. 4, Untreated*

1 Gram in 100 Cubic Centimeters of Sterile Water

	Kept in Laboratory at 70°F.			
	4 Days 20°C.	Bacteria per Gram of Jute 24 Hours—37°C. Total	Red	Coli-Aerogenes per Gram
Start	220,000	26,000	1,500	1,000
1 Day	78,000,000	9,000,000	2,800,000	100,000
2 Days	2,300,000,000	710,000,000	340,000,000	100,000,000
3 Days	1,400,000,000	650,000,000	230,000,000	100,000,000
4 Days	3,000,000,000	1,900,000,000	200,000,000	1,000,000,000
5 Days	11,000,000,000	1,100,000,000	150,000,000	1,000,000,000
7 Days	4,000,000,000	3,500,000,000	550,000,000	100,000,000
8 Days	7,000,000,000	2,100,000,000	420,000,000	100,000,000
9 Days	4,900,000,000	750,000,000	120,000,000	100,000,000
10 Days	4,600,000,000	2,000,000,000	180,000,000	10,000,000
12 Days	11,000,000,000	1,500,000,000	250,000,000	10,000,000
14 Days	6,100,000,000	610,000,000	190,000,000	100,000,000
15 Days	4,200,000,000	270,000,000	90,000,000	100,000,000
16 Days	6,600,000,000	1,200,000,000	240,000,000	100,000,000
17 Days	7,400,000,000	390,000,000	140,000,000	100,000,000

TABLE 4. — *Jute No. 2 Treated in Laboratory*

1 Gram in 100 Cubic Centimeters of Water

Treatment	Water Used	At Start: Bacteria per Gram of Jute 4 Days 20°C.	24 Hrs.—37°C. Total	Red	Coli-Aerogenes per Gram	After 3 Days at 70°F.: Bacteria per Gram of Jute* 4 Days 20°C.	24 Hrs.—37°C. Total	Red	Coli-Aerogenes per Gram*
Boiled and Dried.	Lawrence tap and 1% river water.	23,000	300	0	10	330,000	12,000	130	10
Boiled and Dried.	Andover tap.	4,200	100	0	0	2,100	1	0	0
Boiled and Dried.	Sterile.	900	50	0	0	29,000	60	0	0
Autoclaved	Lawrence tap and 1% river water.	120,000	1,000	300	100	2,900,000	83,000	65,000	10,000
Autoclaved	Andover tap.	2,300	2,600	0	0	14,000	340	0	0

* Multiply by 1,000.

TABLE 5. — *Jute No. 4, in Braided Form, 10 Grams in a Liter of Solution containing 10 Parts Per Million Chlorine Rinsed and Transferred to Sterile Water*

Time of Contact	At Start: Bacteria per Gram of Jute 4 Days 20°C.	24 Hours—37°C. Total	Red	Coli-Aerogenes per Gram	After 3 Days at 70°F.: Bacteria per Gram of Jute* 4 Days 20°C.	24 Hours—37°C. Total	Red	Coli-Aerogenes per Gram*
Start	220,000	26,000	1,500	1,000	–	–	–	–
One Day	11,000	4,900	1,000	1,000	670,000	51,000	28,000	10,000
Two Days	280,000	17,000	1,700	1,000	370,000	34,000	13,000	10,000
Four Days	610,000	170,000	36,000	10,000	98,000	19,000	1,500	100
Two Weeks.	1,700,000	260,000	21,000	100	160,000	2,700	400	10
Jute No. 4 Unbraided and strands laid open One Day Contact	56,000	5,800	0	0	4,000	23	0	0

*Multiply by 1,000.

TABLE 6. — *Jute No. 4, Autoclaved, placed in Sterile Water and Inoculated with a Pure Culture of E. Typhosa and kept at 70°F.*

Figures in Terms of 1 Gram of Jute
Samples Plated on Bismuth Sulphite Agar

	E. TYPHOSA PER GRAM		E. TYPHOSA PER GRAM
Start	12,400		
1 Day	51,000	8 Days . . .	1,700,000
2 Days . . .	81,000	9 Days . . .	23,000,000
3 Days . . .	190,000	10 Days . . .	17,000,000
5 Days . . .	2,100,000	12 Days . . .	8,000,000
6 Days . . .	9,000,000	13 Days . . .	1,200,000
7 Days . . .	13,000,000	14 Days . . .	700,000

REPORT OF THE DIVISION OF TUBERCULOSIS

Alton S. Pope, M.D., *Director*
Louis N. Phaneuf, *Assistant Director*
David Zacks, M.D., *Chief of Clinics*

I have the honor to submit the seventeenth annual report of the Division of Tuberculosis. This report includes an outline of the principal activities of the Division, the annual reports of the four State Sanatoria and the Pondville Cancer Hospital for the fiscal year ending November 30, 1936, together with certain developments in tuberculosis control in the State at large.

During the past year the death rate from pulmonary tuberculosis in Massachusetts for the first time fell below 40 per 100,000 persons living. This means that approximately 1,100 less citizens died of tuberculosis last year than died of that cause ten years ago. Such a steady and continued fall in the death rate, together with a corresponding decline in reported cases, can only mean a reduction in the sources of infection, and should in the near future make the actual control of tuberculosis a possibility.

Tuberculosis Deaths and Death Rates per 100,000

Massachusetts 1927–1936

Year	Pulmonary		Other Forms		Total	
	Deaths	Rate	Deaths	Rate	Deaths	Rate
1927	2,774	66.2	429	10.2	3,203	76.4
1928	2,690	63.9	433	10.3	3,123	74.2
1929	2,561	60.5	361	8.5	2,922	69.1
1930	2,423	56.9	311	7.3	2,734	64.3
1931	2,306	53.9	248	5.8	2,554	59.7
1932	2,041	47.5	261	6.1	2,302	53.5
1933	2,058	47.7	222	5.1	2,280	52.8
1934	1,902	43.8	214	4.9	2,116	48.7
1935	1,814	41.6	147	3.4	1,961	45.0
1936	1,726	39.4	164	3.7	1,890	43.1

State Sanatoria

In 1936, the four State Sanatoria furnished 405,711 days of treatment to 1,918 patients. Of these 1,096 were in the institutions at the beginning of the year and 822 represent new admissions. The cases were divided as follows: Rutland, 664 cases of adult pulmonary tuberculosis; North Reading and Westfield, 775 children with adult or childhood type of the disease; Lakeville, 463 cases of extrapulmonary tuberculosis and 16 cases of convalescent poliomyelitis. This represents a slight decrease in the number of patients, but a slight increase in the total number of patient days of treatment, the reason being fewer transfers from Rutland to the Middlesex County Sanatorium.

Although the 48-hour law went into effect during the fall of 1935 its influence on per capita costs was more apparent during the past year. At Rutland the gross per capita cost for 1936 was $18.39, at North Reading $19.92, at Westfield $24.74, and at Lakeville $22.51. This represents an average increase of 7.6 per cent over the 1935 costs.

Out-patient and consultation clinic examinations of patients referred by physicians and by boards of health continues to be one of the most important activities of the State Sanatoria. During the past year 6,670 diagnostic examinations of such patients were made by the four sanatoria, 193 more examinations than in 1935, or an increase of 3.0 per cent.

Recent improvements at the Sanatoria include the following: The construction of a storehouse at North Reading, permitting the remodelling of the old storeroom for an addition to the employees' dining room. Also an addition to the basement of the schoolhouse for quarters for special classes. At Lakeville an addition to the

occupational therapy shop has made it possible to extend the advantages of this activity to an increased number of patients. Over 5,000 hours of shop work were given last year. Another improvement has been the installation of detached electrical refrigeration units in the administration building and in the storehouse. At Rutland, the completion of a surfaced road adds greatly to appearance and accessibility of the institution.

Unusually severe winter weather delayed construction on the new cancer-tuberculosis unit at Westfield until nearly the first of April. At the end of the year the new storehouse had been completed and accepted. Construction, plumbing and plastering were completed at the nurses' home, and the building should be ready for acceptance by the first of April. Delays in making the necessary changes at the power plant made it impossible to complete the installation of new boilers during warm weather, and necessitated the installation of a temporary 150 horsepower coal-burning boiler to help carry the institution while the new boilers are being installed. The hospital building has been closed in and heat provided for it. Construction and plumbing were nearly completed at the end of the year, and the building will probably be ready for acceptance about the first of June, 1937, and ready for occupancy the latter part of the summer. This unit provides 150 beds for pulmonary tuberculosis in adults and 50 beds for cancer, and will bring thoroughly modern facilities for the treatment of these diseases to the western part of the State.

The next urgent need at the State Sanatoria is the complete reconstruction of the Rutland plant. As pointed out in previous reports, the old buildings are inadequate for carrying out the modern treatment of tuberculosis, and constitute a serious fire hazard to patients and employees. Tentative plans have been drawn for replacement of the old buildings by a modern hospital-type of construction, and by dividing the reconstruction into three units the replacement can be made with only slight temporary loss of beds.

Pondville Cancer Hospital

The work of Pondville Hospital has been substantially increased and facilitated by the addition of a twenty-five bed wing and new service building which were opened in December, 1935. During 1936 admissions rose to 1,474, an increase of 24 per cent for the year, and operations totaled 1,372, an increase of 30 per cent. The Out-Patient Department also showed further growth with a total of 4,991 visits for the year. The addition of an anaesthetist to the visiting staff has contributed materially to the surgical work of the hospital, and the opening of an adequate bacteriological laboratory has made it possible to carry out all necessary bacteriological examinations at the institution. The installation of a new oil-cooled x-ray therapy unit with shock-proof tube stand has made it possible to keep up with the constantly increasing demands for deep x-ray therapy.

As a result of the continued growth of the hospital, as indicated above, and the persistence of a long waiting list in spite of increased facilities, Pondville is faced with the urgent need of a new administration and laboratory building. Such a building should accommodate the business offices as the present quarters are needed at once for expansion of the medical record offices; the pathological, bacteriological and biological laboratories; the medical library; the offices for the superintendent, assistant superintendent, and superintendent of nurses; and provide a recreation and conference hall to take the place of the old recreation building recently condemned as unsafe. Removal of the old laboratories would also provide space for some 15 additional patient beds on the second floor of the old administration building. The need of a dormitory for women employees remains, but the new administration building should be provided this year if possible.

New Projects

Through the interest and generosity of the Commonwealth Fund a field unit has been established to study the spread of tuberculosis in rural areas, and in conjunction with local physicians and existing health agencies to develop more effective methods of control. The area selected for the initiation of this tubercu-

losis control project is Southern Berkshire County where the Commonwealth Fund has for several years assisted the State in the development of progressive local health administration. An office for the unit has been provided at Russell House, Great Barrington, headquarters of the Southern Berkshire Health Association, and the work of the unit is closely co-ordinated with the medical and nursing work of that organization. The staff consists of Dr. Claire W. Twinam, Medical Director, Miss Jessie P. Halbert, public health nurse, and Miss Alice E. Marcoulier, secretary.

As its initial project the unit has attempted to secure complete examination of all families in which tuberculosis has been reported during the past five years in Berkshire County, except in the cities of Adams, North Adams and Pittsfield. During the first nine months such investigations were completed in 40 families, 339 x-rays were taken and 8 cases of tuberculosis were hospitalized. In addition the medical director has served as clinician for the consultation clinics in Great Barrington and North Adams, in co-operation with the Westfield State Sanatorium, a connection which has proved very helpful in his relationship with the local boards of health and with practicing physicians in Berkshire County.

Through the United States Public Health Service certain funds have been made available to supplement and extend the activities of state health departments. Under this provision the Division of Tuberculosis receives salaries for the following positions; a senior statistical clerk to study cancer records at Pondville; two medical social workers to provide services to tuberculosis patients at Rutland and Lakeville Sanatoria, and a junior clerk to provide stenographic service to the social worker at Rutland.

Chapter 346 of the Acts of 1936 authorized the admission of convalescent cases of infantile paralysis to the Lakeville State Sanatorium on the same terms as patients with extra-pulmonary tuberculosis. The rapid decline in extrapulmonary tuberculosis makes it possible to furnish at Lakeville institutional after-care, including surgery when indicated, to considerable numbers of the patients located by the Services for Crippled Children in the Division of Administration of the Department. Charges for children under 21 can be paid from funds received from the Children's Bureau of the Federal Government. The care of adult patients is the responsibility of the board of public welfare of the town of settlement.

To supervise the care of poliomyelitis cases at Lakeville the Department was fortunate in securing the services of Dr. Arthur T. Legg of the Harvard Infantile Paralysis Commission as visiting physician. Two resident physiotherapists carry out the necessary muscle training. Special facilities for the treatment of the cases include equipment for natural and artificial heliotherapy and baking, Hubbard tubs, a respirator and a brace shop. Plans have been drawn for a treatment pool in a separate building to include other treatment facilities.

During the summer of 1936 an attempt was made in some eight towns to check the lists of reported cases of tuberculosis in order to eliminate unnecessary visiting by public health nurses, and so make it possible for the board of health to concentrate on active cases in need of supervision. Medical and x-ray service was furnished by the clinic group of the Department of Public Health, and nursing service by the local board of health. An effort was made to examine all reported cases except those in sanatoria, and those who had had recent examination with x-ray. Some 497 patients were examined, approximately 60 per cent of those asked to report. Of those actually examined 23 per cent were found to have active tuberculosis, and 77.0 per cent had either arrested tuberculosis or no signs of the disease. Reports of individual examinations were made to the family physician and to the board of health, with the recommendation that patients without evidence of active tuberculosis be placed on the inactive list. This procedure promises to reduce materially the mounting load of tuberculosis nursing, and is welcomed by patients because it relieves them from further supervision when it is no longer necessary.

County Sanatoria

One of the most significant developments at the County Sanatoria has been the steady growth of diagnostic services, both in out-patient departments and consultation clinics. Modern sanatorium treatment, including collapse therapy, has greatly improved the prognosis of the individual patient, but the average case

comes to the sanatorium little earlier than he did thirty years ago. The only method which has yielded any large proportion of minimal cases is routine x-ray examination of groups of persons at special risk, and of such groups the most accessible and the most productive consists of family contacts of known patients. Some of the county sanatoria in Massachusetts are now routinely examining the family contacts of all patients on admission, and extension of this practice to all sanatoria would contribute materially to the early discovery of tuberculosis.

The participation of the county sanatoria in the school clinic program during 1936 has been most gratifying. A total of 45,606 children were tuberculin tested by the eight institutions, and 508 cases of childhood type tuberculosis and 19 cases of adult type tuberculosis were found. The greatest difficulty in securing examination has been in the high school group, where the highest incidence of tuberculosis occurs, but practically all counties report a higher per cent of consents than in 1935.

The new unit of the Middlesex County Sanatorium, which includes 160 patient beds and a complete surgical set-up, is nearing completion and should be ready to receive patients in the spring of 1937. It is believed that this addition, and the new sanatorium at Westfield, together with existing facilities, will provide sufficient tuberculosis beds to meet the needs of Massachusetts, even with improved case-finding.

School Clinics

During the school year 1935–1936 the Follow-up Clinic examined 7,379 children, of whom 6,846 were improved and 432 were unimproved. Fifty-two were recommended for sanatorium treatment and 341 were recommended for summer camp. In addition to the above work the clinic examined 629 students in the eight State Teachers Colleges, in co-operation with the State Department of Education, and carried out the checking of old reported cases of tuberculosis in eight cities and towns, as previously described. Substantial progress has also been made in the analysis of the Follow-up Clinic data which should give valuable information on the development of tuberculosis in adolescents.

Social Service

During 1936, the department workers made 820 visits to the homes of patients in 167 cities and towns and made 2,410 contacts with medical and social agencies.

As in previous summers, the social workers took part in the program for the theological students at Lakeville, meeting with them weekly for the discussion of social problems in tuberculosis.

The appointment of a social worker in the Nashoba Health Unit last summer removed the need for the special consultation service in that district which the department has provided for four years.

At the time of the spring floods in the Connecticut Valley the services of Miss Pellegrini were loaned to the American Red Cross for a period of two months to assist in rehabilitation work with families in and around Springfield.

State Subsidy

In 1936, the subsidy of five dollars a week paid to cities and towns for the hospitalization of tuberculosis patients amounted to $461,739.44. This is slightly higher than the total for 1935, but almost identical with the amount paid in 1934. It is expected that there will be a further increase in subsidy next year on account of the opening of additional beds in the Middlesex County Sanatorium, but there is reason to believe that the costs of tuberculosis hospitalization in Massachusetts have practically reached their peak.

Personnel Changes

Dr. Edward G. Huber, Epidemiologist, who resigned July 1st to accept the position of Assistant Director of the Division of Administration, has been succeeded by Dr. Gerald G. Garcelon. On the school clinic staff Dr. Joseph W. Reddy resigned at the end of a year's leave of absence, and his position has been filled by the permanent appointment of Dr. Philip E. Sartwell.

LAKEVILLE STATE SANATORIUM

Resident Officers

Leon A. Alley, M.D., *Superintendent.*
John J. Decker, M.D., *Assistant Superintendent.*
Peter Ferrini, M.D., *Senior Physician.*
Arthur Kanserstein, M.D., *Senior Physician.*
Louis Alpert, M.D., *Assistant Physician.*
William H. Moran, M.D., *Assistant Physician.*
Alvin O. Severance, M.D., *Assistant Physician (Pathology).*
Emanuel Kline, D.M.D., *Dentist.*
Caroline T. White, R.N., *Superintendent of Nurses.*
Ruth E. Sweet, *Head Physiotherapist.*
Grace Daley, *Head Teacher.*
Marion N. Atwood, *Head Occupational Therapist.*
Chester Taylor, *Steward.*
Florence S. Monroe, *Treasurer.*
Susan M. Murphy, *Head Housekeeper.*
Robert A. Kennedy, *Chief Power Plant Engineer.*
T. Frank Mahony, *Head Farmer.*

Non-Resident Officers

Zabdiel B. Adams, M.D., *Senior Physician (Orthopedic Surgery).*
Louis A. O. Goddu, M.D., *Senior Physician (Orthopedic Surgery).*
Arthur T. Legg, M.D., *Senior Physician (Orthopedic Surgery).*
Fletcher H. Colby, M.D., *Senior Physician (Urology).*
Bryant D. Wetherell, M.D., *Senior Physician (Urology).*
William P. Beetham, M.D., *Senior Physician (Ophthalmology).*
George A. Moore, M.D., *Senior Physician (Surgery).*
Shields Warren, M.D., *Senior Physician (Pathology).*
E. Lawrence Oliver, M.D., *Senior Physician (Dermatology).*
Edward E. Jones, M.D., *Senior Physician (Otology, Rhinology, Laryngology).*

Report of the Superintendent

To Henry D. Chadwick, M.D., *Commissioner, Department of Public Health:*

I have the honor to submit the twenty-seventh annual report of the Lakeville State Sanatorium for the year ending November 30, 1936.

Financial Statement

During the year there has been expended $327,995.68 for maintenance, a gross weekly per capita cost of $22.51. There has been collected from miscellaneous sources (the total of all collections) $119,504.92. Deducting this amount from the gross maintenance expenses, leaves a net expense of $208,490.76 and a net weekly per capita cost of $14.31. There has been collected from private sources $3,774.00, from cities and towns $129,538.00, from the State Board of Retirement $102, and from sales $1,418.53.

There were 26 patients supported wholly or in part by private funds; 328 by cities and towns; 2 State wards; 76 wholly by State; and 47 on whom settlement has not been determined.

As authorized by Chapter 162, Acts of 1934 ($6,700 for Lamp Treatment Room and Equipment on Men's Ward) $6,692.33 was expended. Completed. $7.67 reverting to State treasurer. ($6,700 for Lamp Treatment Room and Equipment on Women's Ward) $6,698.70 was expended. Completed. $1.30 reverting to State treasurer. ($4,000 for X-ray Machine and Fluoroscope) $3,957 expended. $43 reverting to State treasurer. As authorized by Chapter 249, Acts of 1934 $1,600, and as authorized by Chapter 304, Acts of 1936 $2,500 Fire Protection and Sprinklers. $794.63 was spent during 1936. $2,125.74 in all. Not completed. As authorized by Chapter 304, Acts of 1936 Improved Water Supply System 1936 $2,200. $707.38 expended. Not completed. As authorized by Chapter 304,

Acts of 1936 Occupational Therapy Shop (Construction) $4,500. $3,959.54 expended during 1936. Not completed. Occupational Therapy Shop (Equipment) $400. $383.98 expended during 1936. Not completed. Under Emergency Public Works Commission Construction Docket 1354 Mass. State Project H-1 $5,000 was appropriated for two Sewage Filter Beds. $4,152.33 expended. Balance $847.67.

Population

There were 278 patients in the sanatorium at the beginning of the year, December 1, 1935, and 283 (270 tuberculous and 13 poliomyelitis) patients at the close November 30, 1936. The largest number present at any one time was 294 and the smallest 261. The daily average number of patients was 280.22 (276.89 tuberculous and 3.33 poliomyelitis); children 160.35 (157.77 tuberculous and 2.58 poliomyelitis); adults 119.87 (119.12 tuberculous and .75 poliomyelitis). There were 201 (185 tuberculous and 16 poliomyelitis) patients admitted during the year. For the classification of patients admitted, your attention is called to Table 6. The average age of tuberculous patients admitted was 27 years and of poliomyelitis patients 14 years. Including deaths there were 196 (193 tuberculous and 3 poliomyelitis) patients discharged. The average duration of residence was 487 days. Of those discharged 142 gained 2,803.75 pounds, an average gain of 19.74 pounds per person. For the condition of patients on discharge your attention is called to Table 7. There were 102,562 (101,342 tuberculous and 1,220 poliomyelitis) hospital days of treatment, 942 less than last year. The average number of employees and officers during the year was 209.01.

Medical Report

The medical and surgical methods of treatment for the various forms of extrapulmonary tuberculosis have been continued throughout the year with very good results in the majority of cases. As during the past few years surgical intervention has been carried out just as early as the patient's condition warranted such procedure. The average duration of residents of patients discharged during 1936 is 90 days less than for 1935. There were 19 deaths during the year, 6 more than for the preceding year. Thirteen autopsies were performed.

There was an increase in the incidence of pulmonary infection in the patients admitted during the year as follows: Whereas 58 or 29% of the 195 patients admitted during 1935 showed x-ray evidence of pulmonary infection, in 1936, 73 or 39% of the 185 tuberculous patients admitted showed x-ray signs of infection. In 1935, 17 of the 58 showed physical signs of pulmonary tuberculosis either active or inactive, while during the past year 28 of the 73 were so classified.

In accordance with Chapter 346 of the Acts of 1936, providing for the care of persons crippled by poliomyelitis at this institution, the first patient suffering from this condition was admitted August 3, 1936. Before the close of the year 16 poliomyelitis patients had been admitted and 3 discharged.

This new type of work necessitated the purchase of considerable additional equipment and apparatus, a part of which was provided from Federal funds by the Services for Crippled Children. One Hubbard tub was purchased for the Children's West Ward for the treatment of women and children. A larger tub of similar type was constructed on the Men's Ward for the treatment of men and older boys. The removal of a partition between two single rooms in the Men's Ward provided space for the location of this tub and a showering slab. This change reduces the patient capacity of the sanatorium from 304 to 302. As much other equipment, in the form of electric bakers and wheel chairs, as limited funds would permit was purchased to be used in the treatment of these new cases.

There was a definite increase in the number of patients examined in the out-patient department. Twenty-three more ex-patients returned for check-up than during the previous year. The figures for the out-patient clinic show in the following list:

Outpatients: Positive, 2; suspicious, 5; negative, 70; re-examination, 8; ex-patients, 92; totals, 177.

Employees: Negative, 194.

Regular school clinics were conducted during the spring and fall months in the towns of Acushnet, Carver, Dartmouth, Fairhaven, Lakeville, Marion, Mattapoisett, Middleboro, Rochester, Wareham, and Westport. The total number of schools visited was 51 with an enrollment of 4,315. Consents for Von Pirquet skin tests were obtained for 2,729 or 63% and this number was tested. Of the number tested, 522 or 19% were positive. The number x-rayed totaled 554. While this number is a little higher than the number of reactors, it is due to the fact that some pupils who had a negative Von Pirquet reaction were x-rayed because of a long period of contact. Out of this number 56 or 11% were found to have some x-ray findings. Thirty-two or 6% of the reactors were classified as having childhood type of tuberculosis. There were no cases of pulmonary tuberculosis in this group. Fifty-six pupils were placed on the follow-up list. All of the Chadwick Clinic follow-up cases in the above mentioned towns were taken over.

Thirty-seven cases of chicken pox and 5 cases of German measles developed among the children during the spring months of the year.

Three articles for radio broadcasting were written by the superintendent during January. An article entitled "The Occurrence of Abscesses from Tuberculous Hips that are Firmly Ankylosed" was written by Dr. Z. B. Adams, orthopedic consultant and was published in the October, 1936 issue of the *Journal of Bone and Joint Surgery.*

Institution Activities

Lectures and demonstrations by the superintendent and medical staff have been given to the following classes:

Senior Students, Middlesex College of Medicine and Surgery.
Senior Students, Boston University School of Medicine.
Senior Theological Students, Andover Newton Seminary.

The following meetings were held at the sanatorium during the year:

South Eastern District Massachusetts Dental Society.
Superintendents' Meeting and Dental Study Club.
Plymouth District of the Massachusetts Medical Society.
Public Health Council.

The occupational therapy department has had a very active year. The increased space provided by the new addition to the work shop has made it possible for many more patients to do shop work. Considerable new equipment has been added resulting in a wide choice of activities for patients of all ages. One hundred and seventy-eight patients enrolled in the shop groups, 572 sessions were held, 5,042 hours of work completed. In the educational groups, 42 patients enrolled for correspondence courses, 37 in the miscellaneous groups, which included the study of Braille, typewriting, special music and work on the sanatorium paper, *The Interpreter.* One hundred and twenty-two patients enrolled in the organized groups which included Home Hygiene, Girl Scouts, Rhythm Band, Junior Birdman, Radio Club, and Male Quartet. One hundred and eighty-four sessions were held with these groups with a total of 1,770 hours completed. The individual hours of ward work completed by bed patients totaled 2,280. The patients completed 2,135 articles under the direction of the occupational therapy department. Nine issues of *The Interpreter* were published and distributed to the patients and staff. The sanatorium paper continues to serve as a useful vehicle for the distribution of medical information among the patients.

The services of the sanatorium librarian have been enjoyed and appreciated by all the patients. The bed to bed service by the librarian makes possible the frequent changing of books and current reading matter. Seventy-five new books were added to the library collections as well as a few new periodicals.

The activities on the farm have been continued, providing all milk, eggs, and poultry meat used during the year. The usual amount of vegetable gardening produced many fresh vegetables in season. The dairy herd continues tuberculosis free.

Personnel Changes

Dr. William D. Wilder, assistant physician, resigned December 7, 1935, and Dr. William H. Moran was appointed assistant physician on January 13, 1936.

Dr. Roger C. Graves, consulting urologist, resigned February 29, 1936, and Dr. Fletcher H. Colby was promoted from associate consultant to consultant. Dr. Bryant D. Wetherell was appointed associate consultant on March 2, 1936.

Dr. Claire W. Twinam resigned as assistant physician in charge of the laboratory April 25, 1936, to accept the position of epidemiologist in the Department.

Dr. Arthur T. Legg was appointed orthopedic consultant for the anterior poliomyelitis cases on August 19, 1936.

Miss Ruth E. Sweet was appointed head physiotherapist on August 3, 1936.

Improvements and Changes

The addition to the nurses' and staff dining rooms started last fall was finished in the spring and relieved a badly congested and unsatisfactory condition.

The installation of a new gas range and broiler in the kitchen has been completed. This new equipment improved the service in this Department as well as resulting in the kitchen being much more livable in warm weather.

The new piggery made possible by an appropriation under Repairs and Renewals has been completed and occupied. This is located on a site southeast of the filter beds and well away from the institution proper and clears up a rather difficult situation that existed because of the location of the old piggery.

Contracts have been placed for the installation of additional sprinklers in six buildings.

New refrigerating equipment has been installed in the storehouse. This equipment has greatly relieved the load on the central unit at the power plant.

A special appropriation made possible an addition to the occupational therapy work shop including equipment which will make possible larger classes and more frequent use of the shop by those patients able to take this form of exercise.

Recommendations

The housing facilities for employees are so badly overcrowded that the existing buildings continue to be entirely inadequate to meet the requirements of the institution's personnel. The construction of additional quarters for both male and female employees is urgently needed.

The admission of patients suffering from the end results of infantile paralysis has raised many problems some of which cannot be adequately solved with the present ward buildings and equipment. During the cold months of the year, these patients cannot tolerate the exposure to cold, as the tuberculous patients do, and should be hospitalized in rooms and small wards in modern hospital buildings. I urgently recommend the early construction of a one-hundred-bed infirmary type of building for the proper housing of many of the post-infantile paralysis patients as well as the seriously ill extrapulmonary tuberculous patients. A swimming pool should be provided without delay so that the proper treatment of the paralyzed and atrophied muscles of the infantile paralysis patients, now being admitted, can be adequately provided. This is one of the most important parts of the treatment of post-infantile paralysis conditions.

Refrigerating equipment for ice making should be provided at the dairy to provide for the proper handling of milk. A unit is also needed, that should be located in the basement of the Administration Building, for ice making to supply the wards and dining rooms. No equipment exists in either of the above locations to meet these requirements.

For several years, in order to meet the requirements of the sanatorium, the power plant has been working at its maximum capacity with no unit standing by for emergency use in case of a breakdown. It will be impossible for the present equipment in the power plant to provide electricity for any additional activities for either lighting or power. Anticipating the construction of a treatment pool and infirmary building in the immediate future, some provision must be made either for a new power plant with a larger capacity than the present one, or an addition to the present out of date plant, to increase its capacity sufficiently to meet the present and future needs of the institution.

There are still many unlighted sections of the sanatorium grounds that, for purposes of safety, should be properly illuminated at night. Requests have been made again in the budget for funds to extend the street lighting system to those

sections. The fighting of a fire in any of the above locations would be seriously handicapped by the lack of necessary lights.

Much more trouble has been experienced in handling the drinking water during the past year than during any previous year. To obviate this difficulty, I urgently recommend that some provision be made in the immediate future for the necessary filtering of the water at its source at Clear Pond.

Acknowledgments

To the clergymen of the various denominations, who have so faithfully ministered to the spiritual welfare of the patients during the past year, I express our deep appreciation and indebtedness.

To the loyal and cooperative members of the medical and nursing staffs and the many other faithful employees, who have assisted in meeting the problems of the year, I am indeed grateful.

The very generous contributions and donations, especially at Christmas time, from the increased number of old and new friends of the sanatorium and patients, were most appreciated and assisted in making possible many happy hours for the children and adults confined here. Such generosity was an inspiration to all those privileged to witness the reaction of the patients, especially during the holidays.

Your continued confidence and helpful advice, as well as that of other members of the Department, is most appreciated.

Respectfully,

Leon A. Alley, M.D.
Superintendent.

Surgical Report

Operations

The following operations were performed during the year:

Amputation foot	1	Resection portion ilium and colon	1
Appendectomies	6	Sequestrectomy	2
Arthrodeses:		Partial ureterectomy	1
Hip	4	Bronchoscopy	1
Knee	5	Curettage tibia	1
Shoulder	1	Dilatation and curettage	1
Spine	7	Excision tumor	1
Enterostomy	2	Incision and drainage	3
Closure enterostomy wound	2	Tonsillectomies and adenoidectomies	22
Hysterectomy	1		
Laparotomy (appendectomy and dilatation and curettage)	1		70
Osteotomy femur	1		
Open reduction fracture ulna	1		
Nephrectomies	3*	Cystoscopies	21
Resection ribs	2	Transfusions	6

* Performed at the Baker Memorial Hospital, Boston.

Casts

Plaster casts for the year were as follows (types classified):

Anterior shells	12	Cylinder with boot	16
Posterior shells	13	Jackets	11
Boots	19	Jacket with collar	7
Boot with cylinder	1	Jacket with helmet	13
Buckets	6	Jacket with double spica	1
Cylinders	14	Jacket with double short spica	31
Cylinder to arm	10	Jacket with single short spica	5
Cylinder to leg	12	Jacket with long short spica	2
Cylinder to wrist	10	Jacket with shoulder spica	2

Jacket with straps	72	Long single spica	26
Jacket with straps and long short spica	2	Long short spica	25
Jacket with straps and double short spica	1	Double short spica	1
Arm moulds	2	Posterior splint to foot	1
Trunk mould	1	Splint to wrist	2
Shoulder spica	1	Wrist	1
Single short spica	23	Reinforcements	64
			407

Laboratory Report

	Number
Blood	
1. Clinical Pathology:	
R.B.C. counts	352
W.B.C. counts	559
Differential counts	555
Haemoglobin determination	478
Sedimentation test	461
Coagulation time	36
Bleeding time	29
2. Chemistry:	
Sugar	6
N.P.N.	224
3. Bacteriology and Serology:	
Blood culture	13
Widal test	65
Blood grouping	30
Sputum	
Smears	1,935
Spinal Fluid	
Routine examination	6
Urine	
Routine analyses	1,886
Phthalein test	46
Feces	
Examinations	58
Occult blood test	13
Stomach Contents	
Gastric analysis	61
Surgical specimens	72
Autopsies	14
Microscopic sections (Paraffin)	932
Pus smears	1,780
Cultures	592
Nose and throat cultures	262
Injections of material into guinea pigs and rabbits	240
Miscellaneous tests	23
Miscellaneous Pathological examinations	27
Specimens sent to Central Laboratory:	
Blood drawn for Hinton and Wassermann tests	231
Blood drawn for Comp. fixation test for G.C.	1
Spinal fluid drawn for Wassermann test	4
Total	10,991

Photographs

Number of photographs taken from December 1, 1935, to November 30, 1936	425

Dental Report

From December 1, 1935, to November 30, 1936

Examinations	422	Radiographs	214
Prophylactic treatments	443	Irrigations	200
Fillings:		Vincent's infection treatments	9
Permanent teeth	775	Root canal treatments	21
Temporary teeth	47	General anesthesia:	
Extractions:		Ether	4
Permanent teeth	209	Ethyl chloride	2
Temporary teeth	206	Local anesthesia:	
Treatments	903	Novocaine	184
Restorations:		Ethyl chloride	35
Dentures:		Topical	165
Full	12	Oral surgical operations	31
Partial	2	Orthodontia treatments	14
Repair	2		
Bridges	3		3,903

Visits	2,058
New patients	214

School Report

The educational program among the school children has been continued as in previous years. One hundred and fourteen children were enrolled in the various grades. Follow-up letters on the discharged patients continue to show gratifying results in that those patients discharged to the public schools have been able to take their place with children of their own age and grade regardless of the fact that their duration of treatment in the sanatorium may have been several years.

Table 1.—*Admissions and Discharges*

Tuberculous Patients

	Adults		Children		Totals
	Males	Females	Males	Females	
Patients in the sanatorium Nov. 30, 1935	69	49	92	68	278
Patients admitted Dec. 1, 1935, to Nov. 30, 1936	51	66	35	33	185
Patients discharged Dec. 1, 1935, to Nov. 30, 1936	56	66	38	33	193
Patients remaining in sanatorium Nov. 30, 1936	*68	*54	85	63	270
Daily average number of patients	67.84	51.28	91.77	66.00	276.89
Deaths (included in number discharged)	10	6	1	2	19
*9 children reached the age of 21 during the year and were shifted to adult columns.					

Poliomyelitis Patients

Patients in the sanatorium Nov. 30, 1935	–	–	–	–	–
Patients admitted Dec. 1, 1935, to Nov. 30, 1936	3	–	8	5	16
Patients discharged Dec. 1, 1935, to Nov. 30, 1936	1	–	2	–	3
Patients remaining in sanatorium Nov. 30, 1936	2	*1	6	4	13
Daily average number of patients	.70	.05	1.57	1.02	3.33
Deaths (included in number discharged)	–	–	–	–	–
*1 child reached the age of 21 during the year and was shifted to the adult column.					

Total of Tuberculous and Poliomyelitis Patients

Patients in the sanatorium Nov. 30, 1935	69	49	92	68	278
Patients admitted Dec. 1, 1935, to Nov. 30, 1936	54	66	43	38	201
Patients discharged Dec. 1, 1935, to Nov. 30, 1936	57	66	40	33	196
Patients remaining in sanatorium Nov. 30, 1936	*70	*55	91	67	283
Daily average number of patients	68.54	51.34	93.33	67.02	280.22
Deaths (included in number discharged)	10	6	1	2	19
*10 children reached the age of 21 during the year and were shifted to adult columns.					

Table 2.—*Civil Condition of Patients Admitted*

Tuberculous Patients

	Adults		Children		Totals
	Males	Females	Males	Females	
Single	26	24	35	33	118
Married	23	36	–	–	59
Widowed	2	5	–	–	7
Divorced	–	1	–	–	1
	51	66	35	33	185

Poliomyelitis Patients

Single	1	–	8	5	14
Married	2	–	–	–	2
Widowed	–	–	–	–	–
Divorced	–	–	–	–	–
	3	–	8	5	16

Total of Tuberculous and Poliomyelitis Patients

Single	27	24	43	38	132
Married	25	36	–	–	61
Widowed	2	5	–	–	7
Divorced	–	1	–	–	1
	54	66	43	38	201

Table 3.—*Ages of Patients Admitted*

Tuberculous Patients

Under 5 years	–	–	5	6	11
5 to 9 "	–	–	7	7	14
10 to 14 "	–	–	11	6	17
15 to 19 "	–	–	9	11	20
20 to 29 "	18	23	3	3	47
30 to 39 "	15	22	–	–	37
40 to 49 "	9	12	–	–	21
50 to 59 "	6	5	–	–	11
60 to 69 "	3	4	–	–	7
70 and over	–	–	–	–	–
	51	66	35	33	185

Poliomyelitis Patients

Under 5 years	–	–	1	1	2
5 to 9 "	–	–	2	1	3
10 to 14 "	–	–	3	2	5
15 to 19 "	–	–	2	–	2
20 to 29 "	2	–	–	1	3
30 to 39 "	1	–	–	–	1
40 to 49 "	–	–	–	–	–
50 to 59 "	–	–	–	–	–
60 to 69 "	–	–	–	–	–
70 and over	–	–	–	–	–
	3	–	8	5	16

Total of Tuberculous and Poliomyelitis Patients

Under 5 years	–	–	6	7	13
5 to 9 "	–	–	9	8	17
10 to 14 "	–	–	14	8	22
15 to 19 "	–	–	11	11	22
20 to 29 "	20	23	3	4	50
30 to 39 "	16	22	–	–	38
40 to 49 "	9	12	–	–	21
50 to 59 "	6	5	–	–	11
60 to 69 "	3	4	–	–	7
70 and over	–	–	–	–	–
	54	66	43	38	201

Average age 26 years.

TABLE 4.—*Nativity and Parentage of Patients Admitted*

Tuberculous Patients

Place of Nativity	Adults						Children						Totals		
	Males			Females			Males			Females					
	Patient	Father	Mother	Patient	Father	Mother	Patient	Father	Mother	Patient	Father	Mother	Patient	Father	Mother
United States:															
Massachusetts	19	6	4	36	11	18	30	14	15	28	7	9	113	38	46
Other New England States	4	3	5	8	9	10	3	6	8	2	3	3	17	21	26
Other States	2	2	1	1	–	1	1	1	–	2	6	2	6	9	4
	25	11	10	45	20	29	34	21	23	32	16	14	136	68	76
Other Countries:															
Armenia	–	1	1	–	1	1	–	–	–	–	–	–	–	2	2
Bermuda	1	1	1	–	–	–	–	–	–	–	–	–	1	1	1
Canada	2	5	4	9	16	11	–	2	1	–	2	1	11	25	17
China	1	–	1	–	–	–	–	1	1	–	–	–	1	1	2
England	2	1	3	–	1	1	–	–	–	–	1	1	2	3	5
Finland	–	–	–	–	–	–	–	–	–	–	2	2	–	2	2
France	–	–	–	–	1	–	–	–	–	–	–	–	–	1	–
Germany	–	–	–	1	1	1	–	–	–	–	–	–	1	1	1
Greece	1	1	1	1	1	1	–	–	–	–	2	2	2	4	4
Ireland	2	6	7	1	5	5	–	–	–	–	1	1	3	12	13
Italy	4	6	6	4	10	10	–	5	5	–	3	3	8	24	24
Lithuania	1	1	1	–	–	–	–	–	–	–	–	–	1	1	1
Newfoundland	2	2	2	–	–	–	–	–	–	–	–	–	2	2	2
Philippine Islands	1	1	1	–	–	–	1	1	1	–	–	–	2	2	2
Poland	1	3	3	–	1	1	–	–	–	–	1	1	1	5	5
Portugal	1	2	2	2	4	3	–	2	1	–	2	1	3	10	7
Russia	3	3	3	1	1	1	–	2	2	–	1	1	4	7	7
Scotland	1	2	2	–	–	–	–	–	–	1	–	2	2	2	4
Sweden	3	3	3	–	1	–	–	–	–	–	–	–	3	4	3
Turkey	–	–	–	1	1	1	–	–	–	–	–	–	1	1	1
Wales	–	1	–	–	–	–	–	–	–	–	–	–	–	1	–
Western Islands	–	–	–	–	–	–	–	–	–	–	–	1	–	–	1
West Indies	–	–	–	1	1	–	–	1	1	–	1	2	1	3	3
Unknown	–	1	–	–	1	1	–	–	–	–	1	1	–	3	2
	51	51	51	66	66	66	35	35	35	33	33	33	185	185	185

Poliomyelitis Patients

United States:															
Massachusetts	1	–	–	–	–	–	8	5	5	4	2	2	13	7	7
Other New England States	–	–	–	–	–	–	–	–	–	1	2	1	1	2	1
Other States	2	1	1	–	–	–	–	–	–	–	–	1	2	1	2
	3	1	1	–	–	–	8	5	5	5	4	4	16	10	10
Other Countries:															
Canada	–	–	1	–	–	–	–	1	1	–	1	1	–	2	3
England	–	–	–	–	–	–	–	1	1	–	–	–	–	1	1
Ireland	–	1	1	–	–	–	–	–	–	–	–	–	–	1	1
Lithuania	–	–	–	–	–	–	–	1	1	–	–	–	–	1	1
Scotland	–	1	–	–	–	–	–	–	–	–	–	–	–	1	–
	3	3	3	–	–	–	8	8	8	5	5	5	16	16	16

TABLE 5.—*Residence of Patients Admitted*

Tuberculous Patients

	Adults	Children	Totals		Adults	Children	Totals
Agawam	1	–	1	Chelsea	4	1	5
Arlington	2	1	3	Danvers	1	1	2
Athol	1	–	1	Dedham	–	1	1
Barnstable	–	2	2	Dennis	–	2	2
Belmont	1	–	1	East Bridgewater	1	–	1
Billerica	1	–	1	Essex	1	–	1
Boston	32	25	57	Everett	1	–	1
Bourne	1	–	1	Fall River	1	1	2
Brockton	1	2	3	Fitchburg	–	1	1
Brookline	2	–	2	Foxboro	1	–	1
Burlington	1	–	1	Gardner	–	2	2
Cambridge	7	2	9	Haverhill	2	1	3

Table 5.—*Residence of Patients Admitted*—Concluded

Tuberculous Patients

	Adults	Children	Totals		Adults	Children	Totals
Hingham	1	–	1	North Adams	1	–	1
Holliston	2	–	2	Norton	–	1	1
Holyoke	1	1	2	Plymouth	1	–	1
Lawrence	3	1	4	Quincy	1	–	1
Lakeville	1	–	1	Randolph	1	–	1
Lowell	1	–	1	Revere	1	1	2
Ludlow	–	1	1	Scituate	–	1	1
Lynn	2	3	5	Somerville	5	1	6
Malden	5	–	5	Springfield	2	–	2
Medford	1	–	1	Taunton	2	1	3
Medway	1	1	2	Wakefield	1	–	1
Melrose	1	–	1	Waltham	3	1	4
Mendon	–	1	1	Warwick	1	–	1
Methuen	–	2	2	Watertown	2	–	2
Middleborough	1	–	1	Webster	1	–	1
Milford	–	1	1	Wellfleet	–	1	1
Millis	–	1	1	Westfield	2	–	2
Millville	1	–	1	Weymouth	1	–	1
Milton	2	–	2	Woburn	–	1	1
Nantucket	–	2	2	Worcester	–	1	1
New Bedford	6	1	7				
Newburyport	–	1	1	Totals	117	68	185
Newton	1	1	2				

Poliomyelitis Patients

	Adults	Children	Totals		Adults	Children	Totals
Attleboro	–	1	1	Middleborough	–	1	1
Boston	–	1	1	Newburyport	–	1	1
Cambridge	1	–	1	Salem	–	1	1
Dedham	1	1	2	Springfield	–	1	1
Everett	–	1	1	Uxbridge	–	1	1
Freetown	–	1	1				
Lynn	1	3	4	Totals	3	13	16

Table 6.—*Diagnosis on Admission*

Tuberculous Patients

	Adults		Children			
	Males	Females	Males	Females	Totals	Percentages
One Lesion						
Tb. adenitis, cervical	–	3	1	7	11	5.94
Tb. adenitis, mesenteric	–	3	–	–	3	1.62
Tb. dactylitis	–	–	1	1	2	1.08
Tb. enteritis	–	–	–	1	1	.54
Tb. entero-colitis	–	–	1	–	1	.54
Tb. hip	1	–	2	3	6	3.24
Tb. knee	–	–	3	–	3	1.62
Tb. ophthalmia	–	2	–	–	2	1.08
Tb. nephritis	2	1	–	1	4	2.16
Tb. peritonitis	1	1	2	1	5	2.70
Tb. sacro-iliac	–	2	–	–	2	1.08
Tb. salpingitis	–	1	–	–	1	.54
Tb. skin	–	2	–	1	3	1.62
Tb. spine	4	4	5	1	14	7.56
Tb. sternum	–	–	1	–	1	.54
Tb. greater trochanter	–	–	–	1	1	.54
	8	19	16	17	60	–
One Lesion with X-ray Evidence of Pulmonary Infection						
Tb. adenitis, cervical	3	3	1	1	8	4.32
Tb. adenitis, inguinal	1	–	–	–	1	.54
Tb. hip	1	2	2	1	6	3.24
Tb. nephritis	1	1	–	–	2	1.08
Tb. ophthalmia	1	–	2	–	3	1.62
Tb. peritonitis	–	1	–	–	1	.54
Tb. shoulder	1	–	–	–	1	.54
Tb. spine	2	1	1	1	5	2.70
	10	8	6	3	27	–
One Lesion with Evidence of Pulmonary Tuberculosis Inactive						
Tb. adenitis, cervical	2	–	–	1	3	1.62
Tb. adenitis, mesenteric	–	1	–	–	1	.54
Tb. fistula-in-ano	–	1	–	–	1	.54
Tb. hip	1	–	1	–	2	1.08
Tb. nephritis	1	–	–	–	1	.54
Tb. peritonitis	–	1	–	–	1	.54
Tb. tongue	–	1	–	–	1	.54
	4	4	1	1	10	–

TABLE 6.—*Diagnosis on Admission*—(Continued)

Tuberculous Patients

	Adults		Children		Totals	Percentages
	Males	Females	Males	Females		
One Lesion with Pulmonary Tuberculosis Active						
Tb. adenitis, cervical	–	1	–	–	1	.54
Tb. spine	1	–	–	–	1	.54
	1	1	–	–	2	–
Two Lesions						
Tb. adenitis, cervical bilateral	1	–	–	–	1	.54
Tb. adenitis, cervical and mesenteric	–	1	–	–	1	.54
Tb. colitis; Tb. adenitis, mesenteric	–	1	–	–	1	.54
Tb. cystitis; Tb. nephritis	1	1	–	–	2	1.08
Tb. endometritis; Tb. spine	–	1	–	–	1	.54
Tb. epididymitis; Tb. orchitis	1	–	–	–	1	.54
Tb. hip; Tb. adenitis, mesenteric arrested	–	–	–	1	1	.54
Tb. nephritis bilateral	–	1	–	–	1	.54
Tb. ophthalmia bilateral	1	3	–	–	4	2.16
Tb. peritonitis; Tb. adenitis, mesenteric	–	1	–	2	3	1.62
Tb. peritonitis; Tb. endometritis	–	1	–	–	1	.54
Tb. peritonitis; Tb. enteritis	–	2	–	–	2	1.08
Tb. peritonitis; Tb. nephritis	–	–	–	1	1	.54
Tb. spine; Tb. dactylitis	–	–	–	1	1	.54
Tb. spine; Tb. nephritis	–	1	–	–	1	.54
	4	13	–	5	22	–
Two Lesions with X-ray Evidence of Pulmonary Infection						
Tb. adenitis, cervical and axillary	–	1	–	–	1	.54
Tb. epididymitis bilateral	1	–	–	–	1	.54
Tb. hip bilateral	–	1	–	–	1	.54
Tb. nephritis bilateral	–	1	–	–	1	.54
Tb. nephritis; Tb. cystitis	–	1	–	–	1	.54
Tb. ophthalmia bilateral	1	1	–	–	2	1.08
Tb. ophthalmia; Tb. adenitis, cervical	–	–	–	1	1	.54
Tb. orchitis bilateral	1	–	–	–	1	.54
Tb. sacro-iliac bilateral	1	–	–	–	1	.54
Tb. spine; Tb. adenitis, cervical	–	1	–	–	1	.54
Tb. spine; Tb. ankle arrested	–	1	–	–	1	.54
Tb. spine; Tb. hip	–	–	1	–	1	.54
	4	7	1	1	13	–
Two Lesions with Evidence of Pulmonary Tuberculosis Inactive						
Tb. adenitis, cervical and axillary	–	1	–	–	1	.54
Tb. enteritis; Tb. peritonitis	–	2	–	–	2	1.08
Tb. hip; Tb. shoulder	1	–	–	–	1	.54
Tb. nephritis; Tb. ear	–	1	–	–	1	.54
Tb. ophthalmia; Tb. nephritis	–	1	–	–	1	.54
Tb. spine; Tb. adenitis, cervical	1	–	–	–	1	.54
Tb. greater trochanter; Tb. spine arrested	1	–	–	–	1	.54
	3	5	–	–	8	–
Two Lesions with Pulmonary Tuberculosis Active						
Tb. spine; Tb. nephritis	1	–	–	–	1	.54
	1	–	–	–	1	–
Three Lesions						
Tb. adenitis, cervical; Tb. epididymitis; Tb. dactylitis arrested	1	–	–	–	1	.54
Tb. elbow; Tb. orchitis arrested; Tb. epididymitis	–	–	1	–	1	.54
Tb. nephritis bilateral; Tb. cystitis	1	–	–	–	1	.54
Tb. ribs; Tb. knee arrested; Tb. elbow arrested	1	–	–	–	1	.54
Tb. trochanteric bursitis; Tb. nephritis; Tb. sternum arrested	–	1	–	–	1	.54
	3	1	1	–	5	–

TABLE 6.—*Diagnosis on Admission*—(Continued)
Tuberculous Patients

	Adults		Children			
	Males	Females	Males	Females	Totals	Percentages
Three Lesions with X-ray Evidence of Pulmonary Infection						
Tb. cystitis; Tb. nephritis; Tb. hip arrested	–	1	–	–	1	.54
Tb. cystitis; Tb. nephritis; Tb. spine	–	–	1	–	1	.54
Tb. ophthalmia bilateral; Tb. spine	–	–	–	1	1	.54
Tb. nephritis; Tb. cystitis; Tb. epididymitis	–	–	1	–	1	.54
Tb. wrist; Tb. uterus; Tb. adnexa	–	1	–	–	1	.54
	–	2	2	1	5	–
Three Lesions with Evidence of Pulmonary Tuberculosis Inactive						
Tb. adenitis, cervical; mediastinal; mesenteric	1	–	–	–	1	.54
Tb. nephritis; Tb. spine arrested; Tb. adenitis mesenteric arrested	–	–	–	1	1	.54
	1	–	–	1	2	–
Three Lesions with Evidence of Pulmonary Tuberculosis Active						
Tb. hip; Tb. epididymitis bilateral	1	–	–	–	1	.54
	1	–	–	–	1	–
Four Lesions with Pulmonary Tuberculosis Active						
Tb. hip; Tb. nephritis; Tb. spine arrested; Tb. wrist arrested	1	–	–	–	1	.54
Tb. nephritis; Tb. epididymitis bilateral; Tb. orchitis	1	–	–	–	1	.54
Tb. spine; Tb. abscess chest wall; Tb. nephritis; Tb. larynx	1	–	–	–	1	.54
	3	–	–	–	3	–
Five Lesions						
Tb. middle ear; Tb. mastoiditis; Tb. epididymitis; Tb. tonsils	1	–	–	–	1	.54
	1	–	–	–	1	–
Five Lesions with Pulmonary Tuberculosis Inactive						
Tb. epididymitis; Tb. orchitis; Tb. fistula-in-ano; Tb. nephritis bilateral	1	–	–	–	1	.54
	1	–	–	–	1	–
Non-Tuberculous						
Adenitis, cervical	–	1	–	–	1	.54
Colitis	–	–	1	–	1	.54
Congenital fistula of lacrymal sac	–	–	1	–	1	.54
Erythema induratum	1	–	–	–	1	.54
Hip	–	1	–	–	1	.54
Osteomyelitis	–	–	2	1	3	1.62
Perinephritic abscess	–	–	1	–	1	.54
Peritonitis	–	–	–	1	1	.54
Pyelonephritis	1	–	–	–	1	.54
Skin	–	–	–	1	1	.54
Spine	–	–	–	1	1	.54
? Malignancy of spine	–	–	1	–	1	.54
Unclassified	4	4	2	–	10	5.40
	6	6	8	4	24	–

TABLE 6.—*Diagnosis on Admission*—(Concluded)

Poliomyelitis Patients

	Adults		Children		Totals
	Males	Females	Males	Females	
Chronic poliomyelitis . .	3	–	8	5	16
	3	–	8	5	16

TABLE 7.—*Condition on Discharge*

Tuberculous Patients

	Adults		Children		Totals	Per-centages
	Males	Females	Males	Females		
Arrested	23	20	30	21	94	48.7
Apparently arrested . .	1	3	1	1	6	3.1
Quiescent	4	18	–	3	25	13.
Improved	10	11	1	–	22	11.4
Unimproved . . .	1	3	–	1	5	2.6
Deaths	10	6	1	2	19	9.8
Not considered . . .	2	2	–	1	5	2.6
Non-tuberculous . . .	5	3	5	4	17	8.8
	56	66	38	33	193	–

Poliomyelitis Patients

Improved	1	–	–	–	1	33.3
Unchanged	–	–	2	–	2	66.7
	1	–	2	–	3	–

Total of Tuberculous and Poliomyelitis Patients

Arrested	23	20	30	21	94	47.9
Apparently arrested . .	1	3	1	1	6	3.
Quiescent	4	18	–	3	25	12.8
Improved	11	11	1	–	23	11.7
Unimproved . . .	1	3	–	1	5	2.6
Deaths	10	6	1	2	19	9.7
Not considered . . .	2	2	2	1	7	3.6
Non-tuberculous . . .	5	3	5	4	17	8.7
	57	66	40	33	196	–

TABLE 8.—*Deaths*

Tuberculous Patients

Duration of Disease	Adults		Children		Totals	Length of Residence				
						Adults		Children		Totals
Months	Males	Fe-males	Males	Fe-males		Males	Fe-males	Males	Fe-males	
Less than 1 month	–	–	–	–	–	1	1	–	–	2
1 to 2 months	–	–	–	–	–	4	2	–	–	6
2 to 3 "	–	–	–	–	–	–	–	1	–	1
3 to 4 "	–	–	–	–	–	1	–	–	–	1
4 to 5 "	–	–	1	–	1	–	–	–	–	–
5 to 6 "	–	–	–	–	–	1	1	–	–	2
6 to 7 "	–	–	–	–	–	–	–	–	–	–
7 to 8 "	–	–	–	–	–	–	–	–	–	–
8 to 9 "	–	1	–	–	1	–	1	–	–	1
9 to 10 "	–	–	–	–	–	–	–	–	–	–
10 to 12 "	2	–	–	–	2	–	–	–	–	–
12 to 18 "	2	–	–	–	2	1	–	–	–	1
18 to 24 "	1	2	–	–	3	1	–	–	1	2
Over 2 years	5	3	–	2	10	1	1	–	1	3
	10	6	1	2	19	10	6	1	2	19

There were no deaths among the poliomyelitis patients.

TABLE 9.—*Causes of Death*

Tuberculous Patients

	Adults		Children		Totals
	Males	Females	Males	Females	
Tb. adenitis, cervical; Tb. abscesses buttock and chest; Chronic nephritis	1	–	–	–	1
Tb. adenitis, cervical; Bacterial endocarditis; Cerebral hemorrhage	–	1	–	–	1
Tb. adenitis, cervical; Tb. hip bilateral; Tb. dactylitis; Tb. meningitis	–	–	–	1	1
Tb. adenitis, retro-peritoneal, pulmonary tuberculosis; Addison's disease	1	–	–	–	1
Tb. enteritis; Tb. peritonitis; Pulmonary tuberculosis; Tb. epiglottis	1	–	–	–	1
Tb. nephritis; Tb. cystitis; Pulmonary edema	1	–	–	–	1
Tb. ophthalmia; Pulmonary tuberculosis; Tb. nephritis	–	1	–	–	1
Tb. spine; Amyloidosis	–	–	–	1	1
Tb. spine; Amyloidosis; Chronic nephritis	1	–	–	–	1
Tb. spine; Amyloidosis; Bronchopneumonia	1	–	–	–	1
Tb. spine; Tb. ankle; Hydronephrosis	–	1	–	–	1
Tb. spine; Tb. hip; Amyloidosis	1	–	–	–	1
Tb. spine; Tb. nephritis; Pulmonary tuberculosis	1	–	–	–	1
Tb. spine; Pulmonary embolism	–	1	–	–	1
Tb. spine; Pulmonary tuberculosis; Tb. meningitis	1	–	–	–	1
Tb. spine; Spontaneous pneumothorax	–	–	1	–	1
Tb. spine; Tb. sterno-clavicular; Tb. foot; Tb. nephritis; Amyloidosis; Thrombosis	–	1	–	–	1
Tb. wrist; Pulmonary tuberculosis; Tb. nephritis; Tb. adrenal; Tb. enteritis; Bronchopneumonia	1	–	–	–	1
Cerebral hemorrhage; Tb. adenitis, cervical	–	1	–	–	1
	10	6	1	2	19

There were no deaths among the poliomyelitis patients.

Financial Report, Lakeville Sanatorium, 1936

To the Department of Public Health:

I respectfully submit the following report of the finances of this institution for the fiscal year ending November 30, 1936.

STATEMENT OF EARNINGS

Board of patients:			
Private	$3,774 00		
Cities and towns	129,538 00		
		$133,312 00	
Personal services:			
Reimbursement from Board of Retirement		$102 00	
Sales:			
Food	$416 47		
Furniture and household supplies	19 80		
Medical and general care	43 43		
Heat, light and power	2 00		
Farm	814 98		
Garage, stable and grounds	79 14		
Repairs, ordinary	21 75		
Miscellaneous junk	20 96		
Total sales		$1,418 53	
Total earnings for the year			$134,832 53
Total cash receipts reverting and transferred to the State Treasurer			$119,504 92
Accounts receivable outstanding Dec. 1, 1935		$32,079 90	
Accounts receivable outstanding Nov. 30, 1936		47,407 51	
Accounts receivable increased			$15,327 61

Maintenance Appropriation

Balance from previous year, brought forward		$6,048 51
Appropriation, current year	$325,070 00	
Supplementary	2,000 00	
Salary increases	4,765 00	
		$331,835 00
Total		$337,883 51
Expenditures as follows:		
Personal services	$205,826 17	
Food	40,678 83	
Medical and general care	13,213 78	
Farm	16,578 80	
Heat, light and power	14,142 26	
Garage, stable and grounds	1,856 86	
Travel, transportation and office expenses	3,979 07	
Religious instruction	1,420 00	
Clothing and materials	899 95	
Furnishings and household supplies	16,020 40	
Repairs ordinary	4,016 27	
Repairs and renewals	9,363 29	
Total maintenance expenditures		$327,995 68
Balance of maintenance appropriation, Nov. 30, 1936		$9,887 83
Estimated outstanding liabilities, Nov. 30, 1936		$7,537 87

Special Appropriations

Balance December 1, 1935, brought forward		$1,168 53
Appropriations for current year		9,600 00
Total		$10,768 53
Expended during the year (see statement below)	$5,845 53	
Reverting to Treasury of Commonwealth	* 51 97	
(Star balances below that are reverting)		5,897 50
Balance November 30, 1936, carried to next year		$4,871 03

Appropriation	Act or Resolve Yr. — Ch.	Total Amount Appropriated	Expended during Fiscal Year	Total Expended to Date	Balance at End of Year
Lamp T. Rm. & Equip. (Men's)	1934–162	$6,700	–	$6,692 33	$7 67*
Lamp T. Rm. & Equip. (Women's)	1934–162	6,700	–	6,698 70	1 30*
X-ray and fluoroscope machine	1934–162	4,000	–	3,957 00	43 00*
Fire protection and sprinklers	1934–249	1,600			
	1936–304	2,500	794 63	2,125 74	1,974 26
Imp. Water Supply System 1936	1936–304	2,200	707 38	707 38	1,492 62
Occupational Therapy Shop:					
Construction	1936–304	4,500	3,959 54	3,959 54	540 46
Equipment	1936–304	400	383 98	383 98	16 02
P.W.A. Docket 1354 Mass. State Project H-1	1934	5,000	–	4,152 33	847 67
Totals		$33,600	$5,845 53	$28,677 00	$4,923 00
Reverting	–	–	–	–	51 97
					$4,871 03

Per Capita

During the year average number of patients has been			280 22
Total cost of maintenance		$327,995 68	
Equal to a weekly per capita cost of (52 weeks to year)		22 51	
Total receipts for the year		119,504 92	
Equal to a weekly per capita of		8 20	
Total net cost of maintenance for year	327,995 68		
	119,504 92		
(Total maintenance less total receipts)			$208,490 76
Net weekly per capita		14 31	

Respectfully submitted,

Florence S. Monroe,
Treasurer.

Inventory, Lakeville State Sanatorium

GRAND SUMMARY SHEET

November 30, 1936

Real Estate

Land, 251.61 acres	$18,065 00	
Buildings	513,408 84	
Betterments (additions and improvements)	169,027 71	
Total, Real Estate		$700,501 55

Personal Property Undistributed Supplies

Travel, transportation and office expenses	$391 10	
Food	6,431 03	
Clothing and materials	1 60	
Furnishings and household supplies	1,789 39	
Medical and general care	2,301 94	
Heat, light and power	450 85	
Farm	315 71	
Garage, stable and grounds	161 02	
Repairs	2,296 62	
Total		$14,139 26

Personal Property Distributed Supplies

Travel, transportation and office expenses	$2,074 98	
Clothing and materials	793 73	
Furnishings and household supplies	46,996 59	
Medical and general care	20,420 53	
Heat, light and power	83 95	
Farm (Live stock, $20,833; all other, $8,464.80)	29,297 80	
Garage, stable and grounds	3,179 07	
Repairs	1,892 20	
Total		$104,738 85

Grand Summary

Real Estate—Total	$700,501 55	
Personal Property—Undistributed Supplies, Total	14,139 26	
Personal Property—Distributed Supplies, Total	104,738 85	
Total		$819,379 66

NORTH READING STATE SANATORIUM

Resident Officers

Carl C. MacCorison, M.D., *Sanatorium Superintendent*
Earle C. Willoughby, M.D., *Assistant Superintendent*
Gerald H. Caron, M.D., *Assistant Physician*
Anna H. Maxwell, M.D., *Assistant Physician*
Rufus R. Little, M.D., *Assistant Physician*
James H. Powers, D.M.D., *Dentist*
Ethel M. Knight, *Institution Treasurer*
Ellen M. Bent, R. N., *Principal, School of Nursing*
Elizabeth Haslett, *Head Housekeeper*
Beulah F. Philbrook, *Head School Teacher*
J. Ellis Doucette, *Sanatorium Steward*
Daniel J. Scott, *Chief Power Plant Engineer*
Edward J. Leary, *Head Farmer*

Non-Resident Officers

Edward D. Churchill, M.D., *Consultant, Thoracic Surgeon*
Zabdiel Adams, M.D., *Consultant, Orthopedic Surgeon*
Halsey B. Loder, M.D., *Consultant, General Surgeon*
Harold L. Higgins, M.D., *Consultant, Pediatrician*
Thomas Odoneal, M.D., *Consultant, Ophthalmologist*
Charles W. DeWolfe, M.D., *Consultant, Laryngologist*
Austin W. Cheever, M.D., *Consultant, Dermatologist*

Report of the Superintendent

To Henry D. Chadwick, M.D., *Commissioner, Department of Public Health:*

I have the honor of submitting the twenty-sixth annual report of the North Reading State Sanatorium for the year ending November 30, 1936.

Financial Statement

During the year there has been expended for maintenance $258,916.76, a gross weekly per capita cost of $19.92. There has been expended $8,381.50 for special appropriations during 1936.

There has been collected from miscellaneous sources $66,738.75 (the total of all collections). Deducting this amount from the gross maintenance expenses leaves a net expense of $192,178.01. The net weekly per capita cost was $14.78. There has been collected from private funds $1,427.00; cities and towns $69,181.00; 15 cases (including 9 from Division of Child Guardianship) were supported by private funds; 294 by cities and towns and 93 wholly by the State.

Population

There were 242 patients at the beginning of the year and 236 at the close of the year. The largest number at any one time was 274 and the smallest number present at any one time was 220. The daily average number of patients was 249.97 as against 253.32. There were 215 patients admitted during the year, five more than last year.

There were 179 cases admitted from cities and towns of over 25,000 population, and 36 cases from cities and towns under 25,000. The average age of patients was 10.14, which is a little below that of last year.

Including deaths, there were 221 patients discharged, and the average duration of residence was 12 months and 25 days. Of those discharged, 196 patients gained 2,772¼ lbs., an average gain of 14.14 lbs. per person.

Of the discharges 18 were apparently well; 124 arrested; 15 apparently arrested; 2 quiescent; 25 improved; 19 unimproved; 2 not considered. There were 16 deaths, 9 more than last year.

There were 91,239 hospital days.

Average number of officers and employees: Males, 62.52; Females, 85.47; total, 147.99.

Medical Report

There has been little if any change in the general medical treatment of our patients during the past year. We are, however, resorting more and more to surgical treatment of the adult type cases. Seventy-four children received artificial pneumothorax during the year, whereas only 44 received pneumothorax the previous year. One thousand seven hundred and thirteen refills were given, 913 more than in previous year. Of this number, 136 were given to ex-patients and ex-employees.

In addition 4 patients had pneumolysis performed; 2 had phrenic nerve operation; 4 had lipiodol injections and bronchoscopic examinations; 1 had thoracoplasty; and 2 had thoracoscopy.

We had one case of scarlet fever during the year.

Nine eye, ear, nose and throat clinics were held by Drs. Odoneal, DeWolfe and Beetham. Ninety-three children were referred to these clinics. Thirty-six were fitted for glasses. Tonsils and adenoids were removed from 15 patients.

Other clinics were held during the year by Drs. Churchill, Higgins and Adams.

Our out-patient work has been continued with practically little change.

There has been a change in the conduct of the consultation clinics in Haverhill and Lawrence during the past year. Inasmuch as the majority of the patients referred to these consultation clinics came through the Board of Health, and it was necessary for the patients to be sent to North Reading for x-ray, we found it unnecessary to send our physicians to Haverhill and Lawrence prior to the patient being x-rayed at North Reading. At present, whenever a private physician, either in Haverhill or Lawrence, refers a case and wishes consultation, our physicians hold themselves in readiness to go to either city at any time, when so requested.

In every instance, physicians asking to have their patients examined find it necessary to send them to North Reading for x-ray; report of the x-ray and examination is made direct to the physician referring the case, and as a result, consultation is rarely asked for.

Following are the out-patients examined by us during the year, including those referred by the Haverhill and Lawrence Boards of Health:

	Negative		Suspicious		Positive		
	New	Re-ex.	New	Re-ex.	New	Re-ex.	Total
Out-Patients .	2	3	827	679	58	303	1,872

Our regular school clinic has been continued in Haverhill, Lawrence, Methuen, Andover, Wakefield, Reading, North Reading, Tewksbury, Wilmington, Lowell, and Cambridge. The total enrollment of these schools in the seventh, ninth and eleventh grades was 17,994. The number tested was 9,033 or 50%. Twenty per cent were reactors.

There were 1,858 x-rayed; 138 received a physical examination. The findings were:

Adult type tuberculosis	2
Adult type suspicious	4
Childhood type tuberculosis	106
Listed for observation	51

Dr. Olive A. Cooper of the Department of Mental Diseases, together with the Psychologist, Miss Culbert, have held ten clinics during the year.

Institution Activities

Talks on tuberculosis were given by the staff in Lynn, Lowell, Lawrence, Swampscott, Salem, North Reading, and also to the following: Harvard School of Public Health Class, Dr. Harold L. Higgins' postgraduate class from the Massachusetts General Hospital, the senior classes of the New England Sanitarium Training School and Malden Hospital Training School and to Dr. Robert H. Nichols' class.

Papers published by the staff during the past year are listed on page 26.

Improvements and Changes

The construction of a new storehouse was begun the latter part of September. This building will be finished before early spring.

Sprinkler heads have been installed in chapel and nurses' dormitory, administration building annex, school building and dormitory, men employees' building.

Eight new garages were built for employees.

The extracurricula room at the schoolhouse was enlarged.

The new chlorinator was installed at the swimming pool.

New medical equipment consisting of a plate changer and tube stand with side rail, stereoscope, gas oxygen machine, electric incubator and microscope was purchased.

Recommendations

A nurses' dormitory to house fourteen night nurses is still needed.

Additions and improvements should be made to our water supply and sewage system.

The engineering department has recommended additional sprinkler heads.

Corroded water supply lines should be replaced.

Extensive repairs are needed on our Perfection stokers.

New refrigerating equipment for freezing and hardening of ice cream should be purchased.

Reshingling of the henhouses and piggery is badly needed.

The ceiling and walls of the ice chest are badly in need of repairs.

Acknowledgments

I wish to thank our clergymen and members of the staff, and the employees for their continued support and cooperation.

I am very grateful to the many friends of the institution who have so generously provided entertainment on various occasions and for the large number of gifts they have sent in to the children.

I am deeply indebted to you and other members of the Department for your advice and support.

Laboratory Report

Blood	
1. Clinical Pathology	
R.B.C. counts	286
W.B.C. counts	1,012
Differential counts	1,015
Hemoglobin estimations	1,026
Sedimentation tests	1,035
Coagulation tests	19
2. Chemistry	
Sugar	5
3. Bacteriology and Serology	
Widal tests	95
Sputum	
Smears	1,353
Concentration tests	34
Spinal Fluid	
Routine examinations	3
Urine	
Routine analyses	1,362
Stomach Contents	
Concentration test for tubercle bacilli	34
Throat cultures	53
Cultures and smears	86
Bacterial counts for milk	53
Babcock tests	53
Total	7,524

Dental Report

The following table is a summary of the work done this year:

Prophylactic treatments	528	X-rays	342
Fillings (permanent teeth)	630	Irrigations	129
Fillings (temporary teeth)	316	Visits	3,322
Extractions (permanent teeth)	493	New patients	293
Extractions (temporary teeth)	666	Dental examinations	3,322
Treatments	304	Total number operating hours	1,179
Restorations	3		

During the past year we have had a larger number of teeth requiring surgical removal. We have also noticed that the children upon entering, particularly between the ages of eight and twelve, require the immediate extraction of their first permanent teeth, namely, first molars which have evidently been badly neglected. It has been the policy of the institution upon admission to clean out all infected areas of the mouth as soon as possible.

During the course of the year emergency dental treatment has been given to 78 of our employees. This has either been extraction or some form of medication.

School Report

During the year covered by this report, the teachers of the North Reading State Sanatorium have, to the best of their ability, adapted their work to the ever-changing body of patients in the institution. Through the school year 1935–1936,

the upper grades and high school were overcrowded. This increase has continued to the present time. Because of this increase, when school opened in September, 1936, it became necessary to rearrange the entire school schedule. Under the present arrangement, grade one is taught in the morning and grade two in the afternoon by Miss Brink. Grades three and four are taught in the morning and grades five and six in the afternoon by Mrs. Leary. Grade seven is taught in the morning and grade eight in the afternoon by Miss Dolan. Grade nine is taught in the morning and grades ten, eleven and twelve in the afternoon by Miss Hoffman. On account of the pressure of upper grade work, it became necessary to suspend our kindergarten.

We have introduced new subjects, namely, algebra and ancient history. This may be regarded as a decided step in advance because these subjects will be accepted as credits for diplomas in every high school course. We are glad to report another forward step. Moreover, by an interchange of subjects and teachers we are achieving departmental work in social science, algebra, ancient history and French. The seventh and eighth grade pupils are going to the high school room for instruction in social science under Miss Hoffman, while the high school students are taught algebra and ancient history by Miss Dolan in the seventh and eighth grade room. High school students are taught French by Miss Labonte.

It is a pleasure to report that the bedside instruction introduced two years ago has proved successful during the current year. The number of pupils in this Department has increased in proportion with the increase in ward patients. The yearly average has been 32 pupils with an aggregate of 70 different lessons. At present we have 38 pupils and 88 lessons. This work being individual requires a large amount of care and detail on the part of the teacher, Miss Labonte. During the present year 3 of these pupils have received grade promotions and 7 have been graduated from the eighth grade, the Superintendent going in person into the wards to present diplomas.

The largest graduating class in the history of the Sanatorium school, 14 in all, received their eighth grade diplomas last June. Five of these were graduated because of bedside instruction and help in summer school.

An incident wholly without precedent may now be reported. By reason of aid which we were able to give, one of our students completed all high school requirements in the commercial course and was given her diploma of graduation.

Our task as teachers is truly great and difficult. At the present time we have enrolled in our many classes 189 pupils including the bed patients in the wards previously mentioned in this report. Let it not be forgotten that these pupils are patients in an institution. They have come to us from many localities in Eastern Massachusetts, from cities and towns in which the educational background differs widely. Consequently each pupil presents a problem for his teacher. It is our duty and our aim to so arrange our work that each child may return to his own home school and go on with the least possible interruption.

School Statistics

	Average Daily Attendance	Percent of Attendance	Total Enrollment
Kindergarten	11.99	85.29	14
Grade I	17.57	95.48	17
Grade II	20.14	98.02	18
Grades III and IV	27.50	97.04	35
Grades V and VI	29.39	95.85	37
Grades VII and VIII	32.366	98.413	42
High School	22.94	95.61	51
Entire school	161.896	95.10	214

Respectfully submitted,

Carl C. MacCorison, M.D.,
Superintendent.

TABLE 1.—*Admissions and Discharges*

	Males	Females	Totals
Patients in Sanatorium Dec. 1, 1935	137	105	242
Patients admitted from Dec. 1, 1935, to Nov. 30, 1936	98	117	215
Patients discharged from Dec. 1, 1935, to Nov. 30, 1936	119	102	221
Patients remaining in Sanatorium Nov. 30, 1936	116	120	236
Daily average number patients	127.07	122.90	249.97
Deaths (included in number discharged)	5	11	16

TABLE 2.—*Classification on Application Blanks and on Admission*

	Classification on Application Blanks		Our Classification on Admission		Per Cent	
	1935	1936	1935	1936	1935	1936
Minimal	47	40	18	28	8.57	13.02
Moderately advanced	30	35	10	11	4.76	5.11
Advanced	8	12	18	20	8.57	9.30
Childhood type tuberculosis	87	89	136	127	64.76	59.07
Malnutrition	0	1	8	7	3.80	3.25
No disease	0	0	6	10	2.85	4.65
Pleurisy with effusion	2	5	0	0	–	–
Bronchiectasis	1	0	2	4	.95	1.85
Empyema	0	0	1	0	.48	–
Lung abscess	0	1	1	0	.48	–
Pulmonary tuberculosis	1	5	0	0	–	–
Observation	8	9	0	0	–	–
Glandular tuberculosis	1	0	0	0	–	–
Convalescing pneumonia	0	0	2	0	.96	–
Bronchial asthma	0	0	1	2	.48	.93
Pro. tuberculosis pneumonia	0	1	0	0	–	–
Acute gastro-enteritis	1	0	1	0	.48	–
Chronic otitis media	0	0	1	0	.48	–
Miliary tuberculosis	2	1	0	0	–	–
Multiple ulcers in right cornea	1	0	0	0	–	–
Pleural	1	0	0	0	–	–
Tracheo-bronadenopathy	0	1	0	0	–	–
Unclassified	20	15	1	0	.48	–
Deferred	0	0	4	0	1.90	–
Mediastinal tumor	0	0	0	1	–	.47
Pulmonary fibrosis	0	0	0	1	–	.47
Spina bifida	0	0	0	1	–	.47
Congenital heart disease	0	0	0	1	–	.47
Convalescing lobectomy	0	0	0	1	–	.47
Resolving pneumonia	0	0	0	1	–	.47
	210	215	210	215	–	–

TABLE 3.—*Civil Condition of Patients Admitted*

	Males	Females	Total
Single	98	117	215
Total	98	117	215

TABLE 4.—*Age of Patients Admitted*

	Males	Females	Total	Per Cent
Under 5 years	16	16	32	14.88
5 to 9 years	31	24	55	25.58
10 to 14 years	36	46	82	38.14
15 to 19 years	15	31	46	21.40
20 years and over	0	0	0	–
Average age	9.50	10.67	10.14	–
Total	98	117	215	100.00

TABLE 5.—*Nativity and Parentage of Patients Admitted*

Place of Nativity	Males			Females			Total		
	Patients	Fathers	Mothers	Patients	Fathers	Mothers	Patients	Fathers	Mothers
United States:									
Massachusetts	88	40	40	105	44	42	193	84	82
Other New England States	2	2	5	2	6	6	4	8	11
Other States	4	4	2	6	8	8	10	12	10
	94	46	47	113	58	56	207	104	103
Other Countries:									
Africa	0	0	0	0	0	1	0	0	1
Albania	0	1	1	1	1	1	1	2	2
Armenia	0	1	1	0	1	1	0	2	2
Austria	0	1	0	0	0	0	0	1	0
Azores	0	0	0	0	1	0	0	1	0
Barbadoes	0	0	0	0	1	1	0	1	1
Bermuda	0	0	0	0	0	1	0	0	1
Canada	1	10	12	1	9	8	2	19	20
Cape Verde	0	4	3	0	0	0	0	4	3
Dutch West Indies	0	0	0	0	1	0	0	1	0
Egypt	1	0	0	0	0	0	1	0	0
England	0	2	2	0	3	2	0	5	4
Finland	0	1	1	0	0	1	0	1	2
Greece	0	1	1	0	1	1	0	2	2
Ireland	0	3	7	1	7	12	1	10	19
Italy	1	16	10	1	20	17	2	36	27
Lithuania	0	0	0	0	1	0	0	1	0
Newfoundland	0	1	1	0	0	2	0	1	3
Norway	0	1	1	0	2	0	0	3	1
Poland	0	2	2	0	3	4	0	5	6
Portugal	1	3	3	0	1	1	1	4	4
Russia	0	3	3	0	2	2	0	5	5
Scotland	0	2	2	0	2	3	0	4	5
Sweden	0	0	1	0	2	1	0	2	2
Syria	0	0	0	0	1	1	0	1	1
Unknown	0	0	0	0	0	1	0	0	1
Total Foreign	4	52	51	4	59	61	8	111	112
Grand Total	98	98	98	117	117	117	215	215	215

TABLE 6.—*Residence of Patients Admitted*

Amesbury	1	Chelsea	10	Lynn	8	Provincetown	1
Ashland	1	Dartmouth	1	Malden	8	Quincy	10
Barnstable	4	Dracut	2	Manchester	1	Revere	7
Belmont	1	Everett	8	Mansfield	1	Saugus	2
Beverly	2	Falmouth	1	Medford	6	Somerville	13
Billerica	2	Gloucester	2	Medway	2	Tyngsborough	1
Bolton	1	Hamilton	1	Methuen	1	Waltham	2
Boston	63	Haverhill	3	Newburyport	1	Watertown	1
Brookline	1	Lawrence	8	Newton	4	Winthrop	1
Cambridge	24	Lexington	2	Norwood	2		
Chelmsford	3	Lowell	1	Peabody	1	Total	215

TABLE 7.—*Stage of Disease on Admission*

	Males	Females	Total	Percentage
Childhood type tuberculosis	61	66	127	59.07
Minimal	8	20	28	13.02
Moderately advanced	7	4	11	5.11
Advanced	6	14	20	9.30
Malnutrition	6	1	7	3.25
No disease	5	5	10	4.65
Convalescing lobectomy	0	1	1	.47
Bronchial asthma	1	1	2	.93
Bronchiectasis	2	2	4	1.85
Pulmonary fibrosis	1	0	1	.47
Mediastinal tumor	0	1	1	.47
Congenital heart disease	0	1	1	.47
Spina bifida	0	1	1	.47
Resolving pneumonia	1	0	1	.47
Total	98	117	215	100.00

TABLE 8.—*Condition on Discharge*

	Males	Females	Total	Percentage
Apparently well	13	5	18	8.15
Arrested	75	49	124	56.11
Apparently arrested	6	9	15	6.79
Quiescent	1	1	2	.90
Improved	15	10	25	11.31
Unimproved	4	15	19	8.60
Died	5	11	16	7.24
Not considered	0	2	2	.90
Total	119	102	221	100.00

TABLE 9.—*Deaths*

Duration of Disease	Males	Females	Total	Length of Residence at Sanatorium		
				Males	Females	Total
Under 1 month	0	1	1	0	2	2
1 to 2 months	0	0	0	0	1	1
2 to 3 months	0	1	1	0	0	0
3 to 4 months	0	2	2	1	1	2
4 to 5 months	0	0	0	1	0	1
5 to 6 months	0	0	0	1	2	3
6 to 7 months	0	2	2	0	0	0
7 to 8 months	0	0	0	0	1	1
8 to 9 months	0	0	0	0	0	0
9 to 10 months	0	1	1	0	0	0
10 to 11 months	0	0	0	0	0	0
11 to 12 months	0	0	0	0	0	0
12 to 18 months	2	0	2	1	1	2
18 to 24 months	0	0	0	0	1	1
Over 2 years	3	4	7	1	2	3
Total	5	11	16	5	11	16

TABLE 10.—*Cause of Death*

	Males	Females	Total
Tuberculosis of lungs	2	10	12
Tuberculosis enteritis	1	0	1
Tuberculosis of lungs and tuberculous meningitis	2	0	2
Bronchopneumonia	0	1	1
Total	5	11	16

Financial Report, North Reading State Sanatorium, 1936

To the Department of Public Health:

I respectfully submit the following report of the finances of this institution for the fiscal year ending November 30, 1936.

STATEMENT OF EARNINGS

Board of patients:			
Private	$1,427 00		
Cities and towns	69,181 00		
		$70,608 00	
Personal services:			
Reimbursement from Board of Retirement		$75 00	
Sales:			
Food	$28 75		
Clothing and materials	179 50		
Furniture and household supplies	57 27		
Medical and general care	82 28		
Heat, light and power	5 75		
Farm	123 14		
Repairs, ordinary	3 10		
Miscellaneous junk	204 80		
Total sales		$684 59	
Miscellaneous:			
Interest on bank balances	$3 68		
Rents (garages)	399 25		
Total, miscellaneous		$402 93	
Total earnings for the year			$71,770 52
Total cash receipts reverting and transferred to the State Treasurer			$66,738 75
Accounts receivable outstanding Dec. 1, 1935		$17,439 37	
Accounts receivable outstanding Nov. 30, 1936		22,471 14	
Accounts receivable increased			$5,031 77

Maintenance Appropriation

Balance from previous year brought forward		$4,425 79
Appropriation, current year	$271,500 00	
Salary increases	3,055 00	
		274,555 00
Total		$278,980 79
Expenditures as follows:		
Personal services	$168,861 76	
Food	41,400 71	
Medical and general care	10,269 22	
Farm	3,463 76	
Heat, light and power	13,358 30	
Garage, stable and grounds	1,875 83	
Travel, transportation and office expenses	2,703 69	
Religious instruction	1,599 97	
Clothing and materials	1,494 63	
Furnishings and household supplies	5,444 64	
Repairs, ordinary	2,997 04	
Repairs and renewals	5,447 21	
Total maintenance expenditures		$258,916 76
Balance of maintenance appropriation, Nov. 30, 1936		$20,064 03
Estimated outstanding liabilities, Nov. 30, 1936		$3,723 15

Special Appropriations

Balance Dec. 1, 1936, brought forward		$2,427 16
Appropriations for current year		15,000 00
Total		$17,427 16
Expended during the year (see statement below)	$8,381 50	
		8,381 50
Balance Nov. 30, 1936, carried to next year		$9,045 66

Appropriation	Act or Resolve Ch. Yr.	Total Amount Appropriated	Expended during Fiscal Year	Total Expended to Date	Balance at End of Year
Improvement Water Supply	249–1935	$1,500 00	$1,477 00	$1,477 00	$23 00
Fire Protection and Sprinklers	249–1935, 304–1936	4,500 00	1,188 71	2,296 55	2,203 45
Purchase of Land	497–1935	35 00	35 00	35 00	–
Addition to Store House	304–1936	10,500 00	5,680 79	5,680 79	4,819 21
Employees' Dining Room	304–1936	2,000 00	–	–	2,000 00
		$18,535 00	$8,381 50	$9,489 34	$9,045 66

Per Capita

During the year the average number of patients has been		249.97
Total cost of maintenance	$258,916 76	
Equal to a weekly per capita cost of (52 weeks to year)	$19 92	
Total receipts for the year	$66,738 75	
Equal to a weekly per capita of	5 13	
Total net cost of maintenance for year (total maintenance less total receipts)		$192,178 01
Net weekly per capita	14 78	

Respectfully submitted,

Ethel M. Knight,
Treasurer.

Inventory, North Reading State Sanatorium

GRAND SUMMARY SHEET

November 30, 1936

Real Estate

Land, 115.11 acres	$11,178 00
Buildings	611,298 32
Betterments (additions and improvements)	138,622 33
Total, Real Estate	$761,098 65

Personal Property Undistributed Supplies

Travel, transportation and office expenses	$237 93
Food	4,618 89
Clothing and materials	2,977 82
Furnishings and household supplies	2,501 24
Medical and general care	652 04
Heat, light and power	1,110 99
Farm	184 16
Garage, stable and grounds	140 37
Repairs	95 19
	$12,518 63

Personal Property Distributed Supplies

Travel, transportation and office expenses	$5,302 88
Clothing and materials	3,068 01
Furnishings and household supplies	79,175 44
Medical and general care	31,292 21
Heat, light and power	51 36
Farm	8,558 28
Garage, stable and grounds	6,573 58
Repairs	7,095 99
Total	$141,117 75

Grand Summary

Real Estate—Total	$761,098 65
Personal Property—Undistributed Supplies, Total	12,518 63
Personal Property—Distributed Supplies, Total	141,117 75
	$914,735 03

RUTLAND STATE SANATORIUM

Resident Officers

Ernest B. Emerson, M.D., *Superintendent.*
Paul Dufault, M.D., *Assistant Superintendent.*
Armand Laroche, M.D., *Senior Physician.*
Gabriel Nadeau, M.D., *Senior Physician.*
Charles K. McCarthy, M.D., *Assistant Physician.*
Ruby Delphina McCarthy, M.D., *Assistant Physician.*
Isadore L. Cutler, M.D., *Assistant Physician.*
Gulli Lindh Muller, M.D., *Assistant Physician (Pathologist).*
James Q. Haralambie, M.D., *Assistant Physician.*
Delya E. Nardi, R.N., *Principal of the School of Nursing.*
Rena Blanche Nauss, R.N., *Assistant Principal of the School of Nursing.*
Marguerite McNamara, *Dietitian.*
Grace L. Broe, *Assistant Dietitian.*
Philip G. Zaramba, *Steward.*
Mary A. Boyle, *Institution Treasurer.*
Harry U. Wendell, *Chief Power and Plant Engineer.*
Joseph A. Carroll, *Head Farmer.*
Nora G. O'Connell, *Head Housekeeper.*

Non-Resident Officers

Frank H. Washburn, M.D., *Senior Physician.*
Edward D. Churchill, M.D., *Senior Physician.*
G. Arnold Rice, M.D., *Senior Physician.*
Shields Warren, M.D., *Senior Physician (Pathologist).*
William J. O'Connor, D.M.D., *Dentist.*
Roscoe W. Myers, M.D., *Ophthalmologist.*

Report of the Superintendent

To Dr. Henry D. Chadwick, *Commissioner, Department of Public Health:*

I have the honor to submit the fortieth annual report of the Rutland State Sanatorium for the year ending November 30, 1936.

Financial Report

During the year there has been expended $352,835.25 for maintenance, a gross weekly per capita cost of $18.39. This is an increase of $25,390.57 over the expenditures for 1935, allocated approximately as follows: Personal Services, $20,858.82,

due to step increases June first; Food, $5,281.88, an increase of about 10% in the cost of raw foods; Medical and General Care, $5,794.80, excess cost for the twelve month period over the six month period in 1935 for hospitalization of surgical cases at the Massachusetts General Hospital.

There has been expended from Special Appropriations authorized by Chapter 162, Acts of 1934, Sprinklers, $137.18; by Chapter 249, Acts 1935, Reconstruction of Road, $11,345.39; from Emergency Public Works Commission, Construction Massachusetts State Projects, Docket 2275, H-3, New Boilers, $322.01. All of the foregoing projects have been completed.

There has been collected from miscellaneous sources $154,533.80, an increase of $871.16 over the collections of 1935. Deducting the total collections from the gross maintenance expense leaves a net expense of $198,301.45, a net weekly per capita cost of $10.34. There has been collected from private sources $26,145; from cities and towns, $76,421.82; from the Tubercular Hospital District of Chelsea, Revere and Winthrop, $40,050.71.

Seventy-two cases were supported wholly or in part from private funds; 135 cases by cities and towns; 48 cases by the Tubercular Hospital District of Chelsea, Revere and Winthrop; 78 cases wholly by the State. There were 30 cases on which settlement had not been determined.

Population

There were 366 patients in the sanatorium at the beginning of the year and 361 at the close. The largest number present at one time was 383 and the smallest 361. The daily average number of patients was 368.80, an increase of 9.18 over last year. There were 298 patients admitted during the year, 100 less than last year; 21 minimal, 113 moderately advanced, 155 far advanced, 4 unclassified, 1 tuberculous empyema, 1 bronchiectasis and pulmonary tuberculosis, 1 bronchiectasis and 2 childhood type. There were 215 admitted from cities and towns of over 25,000 population and 83 from cities and towns under 25,000 population. The average age of patients admitted was 30.71, a decrease of 1.16. Including deaths there were 303 patients discharged, 86 less than last year. The average duration of residence was 377 days, 23 more than last year. Of those discharged, 189 gained 2,160½ pounds, an average gain of 11.43 pounds per person. Of the discharged, there were 7 apparently arrested cases, 4 less than last year, 141 quiescent, 4 less than last year, 35 improved, 49 unimproved, 1 bronchiectasis, 1 case of atelectasis and chronic pulmonary suppuration with question of tuberculosis and 7 not considered, the duration of treatment being less than one month. There was one case discharged non-tuberculous. There were 61 deaths, the same as last year. There were 134,980 days of treatment, 3,755 more than last year.

Average number of employees and officers during the year: males, 125.92; females, 100.41; total, 226.33.

Further statistical details are shown in the tables which are a part of this report.

Medical Report

The papers published by the staff during the year will be found on page 26.

The consultation clinics have been continued in Athol, Gardner, Southbridge, Milford, and at the sanatorium. I believe there should be some arrangement, a change in the law if necessary, whereby cases might be admitted for observation and treatment pending a diagnosis. At present, the patient is denied this opportunity until he can be labeled tuberculous.

The tables show in detail the medical activities of the past year.

Institution Activities

The Training School is in its twenty-ninth year.

Lectures and demonstrations have been given by the medical staff and special instruction by the following: Dr. Edward Crane, Assistant Surgeon, Holden District Hospital, Surgery; Dr. Helen McGillicuddy, Social Hygiene; and Mrs. Helen Hackett, Public Health Nursing.

The hospital affiliations are:

Cooley Dickinson	9 months
Boston City Hospital	1 year
Boston Floating Hospital	3 months

Graduation exercises were held November 10, 1936. The address was given by Professor Harold H. Wade, Head Master, Worcester Academy, Worcester, Massachusetts. There were 60 alumnae present at the exercises.

The following were awarded diplomas:

Helen Mary Thompson
Elizabeth Frances Creedon
Gladys Annie Abare
Marguerite Mary McCann
Mary Barbara Welsh
Annie Hazel Jones
Rita Olive Crepeau
Margaret Dorothy Smith
Marjorie Melvina Hamilton
Edith Helen Halonen
Elizabeth Sue Carr

There are 204 graduates of the school.

The following have been awarded diplomas after completing the six months' postgraduate course:

Marjorie Frances McKee, Union Hospital, Framingham.
Miriam Bourque Spring, Danvers State Hospital.
Ethel Mae Armstrong, New England Sanatorium, Melrose.

There are 22 student nurses: 13 seniors, 7 juniors and 2 postgraduates.

Personnel Changes

Dr. Philip E. Zanfagna resigned May 18, 1936, after completing a six months' residency. He was succeeded by Dr. James Q. Haralambie, appointed July 1, 1936.

Dr. Israel Kahalas resigned September 22, 1936, after five years of meritorious service as assistant physician, to continue the practice of his specialty in Boston. He was succeeded by Dr. Isadore L. Cutler, a graduate of Tufts Medical School and the Carney Hospital, who was appointed assisted physician September 22, 1936.

An assistant dietitian has been added to the quota of employees.

Recommendations

A recommendation was made in the annual report last year for the construction of two wards as the first step towards rebuilding the institution. The present buildings are obsolete and inadequate to meet present day requirements for the treatment of tuberculosis. I am, therefore, recommending an appropriation of $375,000 for the construction of two hospital wards for men and women, and an appropriation of $130,000 for the construction of dormitories for male and female employees, in order to relieve the overcrowding and to discontinue the outside maintenance necessitated by the Forty-eight Hour Law.

Further appropriations recommended are: $6,000 for the construction of a surfaced road on the west side of the institution, extending from the stock room, by ward M and connecting at the foot of the hill with the road which was completed this year; $14,080 for additional water supply for fire protection; $1,990 to complete the lightning protection; $7,200 for further fire protection to the farm buildings.

Referring to the recommendation last year for the installation of generators, I believe that further study should be made of the relative merits of continuing the purchase of electric current, or making it on the place. Included in this survey should be a study of the relative costs of coal and oil.

The following recommendations are made under Repairs and Renewals: Adjustable hospital beds, $2,400; repairs to bungalow and house on State Road, $3,000; sound equipment, $1,200; oil ranges, $1,000; engine room equipment, $500; refrigerators, $1,150; store room alterations in surgical building, $850; tractor and plow for snow work, $3,500; new floors, $1,500; painting of tank, $500.

Acknowledgments

In closing, I wish to acknowledge with gratitude the services of our chaplains, the Reverend Father Sullivan, the Reverend Robert French, the Reverend Father Smith and Rabbi Zeldner.

I am also deeply grateful for the cooperation and loyalty of every employee, and in closing may I express my appreciation of your confidence, support and counsel over another year.

Respectfully,
Ernest B. Emerson, M.D.,
Superintendent.

Surgical Report

The following is a list of the surgical operations performed at the sanatorium:

Appendectomy	10
Biopsy	4
Bronchoscopy	52
Cholecystectomy	2
Circumcision	1
Cystoscopy	3
Dilatation, curettage and cauterization of the cervix	3
Dilatation, curettage and insertion of Chamber's Pessary	1
Dilatation, curettage and removal of polyp	1
Enterostomy	1
Episiotomy	1
Excision Bartholin's gland	1
Hemorrhoidectomy	2
Herniorrhaphy	1
Intrapleural pneumolysis	43
Nephrectomy	1
Operation to relieve fistula in Ano	1
Phrenicectomy	4
Phrenic emphraxis	53
Salpingectomy	1
Salpingooophorectomy	1
Simple mastoidectomy	1
Sub-Total hysterectomy	1
Thoracotomy	8
Tonsillectomy	11
Total	208

Artificial pneumothorax treatments	6,488
Aspirations of the pleural cavity	206
Oleothorax	13
Excision of tumor of the breast	2
Number of patients in sanatorium on November 30, 1936, receiving pneumothorax therapy	144
Number of patients that received pneumothorax during the year	252
Number of patients that received oleothorax during the year	4
Number of out-patients that received pneumothorax during the year	70
Number of out-patients receiving pneumothorax at the present time	39

There were 36 thoracoplasties performed at the Massachusetts General Hospital, 7 less than last year.

Laboratory Report

Blood

1. Clinical Pathology

R.B.C. count	598
W.B.C. count	2,206
Differential count	2,204
Hemoglobin (Hellige)	2,524
Sedimentation test	2,169
Hematocrit	2,169
Icteric index	462
Coagulation	129
Van Den Bergh test	3

2. Chemistry	
Sugar (Folin)	47
N.P.N.	11
Cholesterol	3
Congo Red test	24
3. Bacteriology and Serology	
Culture	5
Widal test	24
Sputum	
Smears for tubercle bacilli	2,156
Concentration test	2,062
Culture	493
Guinea pig inoculations	80
Pleural Fluids	
Cultures	461
Smears	186
Spinal Fluids	
Cell count	4
Chemical	4
Urine	
Routine analyses	883
Mosenthal test	8
Total chlorides	31
P.S.P. test	19
Bile test	2
Feces	
Occult blood	5
Tubercle bacilli, ova, etc.	27
Stomach Contents	
Acidity	5
Concentration test for tubercle bacilli	4
Surgical Specimens	63
Autopsies	19
Bacteriological Smears	108
Bacteriological Cultures	81
Microscopical Sections	735
Specimens sent to Central Laboratory	
Cultures from urine and feces for bacilli typhosus	96
Blood for Widal test	28
Blood for Hinton and Wassermann tests	328
Spinal fluid for Wassermann and Gold Sol	1
Preparation of Autogenous Vaccine	1
Total	20,468

Of the total number of patients in sanatorium November 30, 1936 (361), 83.2% have had a positive sputum; in 12.7% tubercle bacilli were not found; 4.1% reported no sputum.

Smallpox vaccinations, 207. Typhoid and paratyphoid A and B inoculations, 202.

Number of x-rays taken in the fiscal year December 1, 1935, to November 30, 1936:

Chest films:	
Patients	2,116
Out-patients	948
Total	3,064
Dental films	976
Total number of x-rays taken	4,040

Photographs taken from February 17, 1936, to November 30, 1936:

Of x-rays	404
Of people	9
Of scenes	6
Of charts	26
Total	445

Prints and lantern slides made during the same period:

Prints on film	306
Prints on paper	63
Prints on translite	83
Total prints	452
Lantern slides	93
Total	545

The following tables indicate the work of the consultation service, out-patient and others:

Number of patients examined at the Gardner, Milford, Southbridge and Athol clinics, 749.

Diagnosis:

Pulmonary tuberculosis	41
Non-tuberculous	260
Pleurisy (unknown origin)	5
Childhood type	32
Bronchiectasis	8
Glandular tuberculosis	1
Childhood type and pleurisy	1
Lung abscess	1
Observation	322
Total	671

There were re-examined at the consultation clinics during the year the following:

Pulmonary tuberculosis	11
Childhood type tuberculosis	9
Non-tuberculous	3
Observation	23
Total	46

Consultation cases to the number of 717 were referred for 824 examinations and 32 ex-patients were referred for 44 follow-up examinations, making a total of 868 examinations at the consultation clinics.

Number of patients examined once, 626; twice, 79; three times, 9; four times, 2; five times, 1.

Number of ex-patients examined once, 25; twice, 4; three times, 2; five times, 1.

Number of physicians referring cases 119, 14 more than last year.

Sanatorium Out-patient Clinic:

Patients referred by physicians	313
Patients examined at own request	153
	466
Ex-patients examined at own request	242
Total	708

Diagnosis:

Pulmonary tuberculosis	40
Childhood type	18
Non-tuberculous	232
Observation	95
Tuberculous pleurisy	2
Pleurisy (unknown origin)	1
Bronchiectasis	2
Total	390

There were re-examined at the sanatorium during the year the following:

Pulmonary tuberculosis	44
Childhood type	4
Observation	28
Total	76

This year 466 patients reported for 513 examinations and 242 ex-patients reported for 278 examinations, making a total of 791 examinations at the sanatorium.

Number of patients examined once, 422; twice, 41; three times, 3.

Number of ex-patients examined once, 217; twice, 18; three times, 3; four times, 4.

Number of physicians referring patients to the sanatorium, 178, 18 more than last year.

The total of all examinations made during the year exclusive of routine work was 1,659.

Dental Report

The following is a summary of the dental work done during the year:

Abscess treatments	3	Mouth washes	187
Adjusting plates	17	New patients	210
Ankylosis	1	Osteomyelitis cases	3
Bed visits	17	Post extractions	357
Cellulitis	2	Prophylaxis	145
Emergency cases	6	Pyorrhea	52
Epulis tumors	1	Removing bony process	1
Examinations	233	Removing bridge	7
Exostosis	6	Repairing plates	11
Extractions	420	Restorations	14
Fillings	465	Stomatitis cases	5
Gingivitis treatments	259	Treatments	1,001
Hemorrhage checked	6	Trismus	2
Hypertrophied gum cases	4	Visitors	2,775
Impacted teeth extracted	2	Vincents	2
Irrigations	16	Vulcanite stomatitis	2
Lancing gums	17	X-rays	976

Statistical Tables

Table 1.—*Admissions and Discharges*

	Males	Females	Total
Patients in Sanatorium November 30, 1935	185	181	366
Patients admitted December 1, 1935, to November 30, 1936, inclusive	153	145	298
Patients discharged December 1, 1935, to November 30, 1936, inclusive	158	145	303
Patients remaining in Sanatorium November 30, 1936	180	181	361
Daily average number of patients	185.12	183.68	368.80
Deaths (included in number discharged)	33	28	61

TABLE 2.—*Classification on Admission*

	Classification on Application Blanks		Our Classification on Admission		Percentages	
	1935	1936	1935	1936	1935	1936
Minimal	83	45	26	21	6.53	7.04
Moderately advanced	191	169	175	113	43.97	37.92
Far advanced	87	60	170	155	42.72	52.01
Unclassified	37	22	7	4	1.76	1.34
Childhood type	–	2	2	2	.50	.67
Tuberculous empyema	–	–	–	1	–	.34
Childhood type and cervical adenitis	–	–	1	–	.25	–
Bronchiectasis	–	–	2	1	.50	.34
Bronchiectasis and pulmonary tuberculosis	–	–	–	1	–	.34
Lung abscess	–	–	1	–	.25	–
Pleurisy (unknown origin)	–	–	7	–	1.76	–
Tuberculous pleurisy	–	–	1	–	.25	–
Chronic sinusitis	–	–	1	–	.25	–
Spontaneous pneumothorax	–	–	3	–	.76	–
Hemiplegia and probable cerebral hemorrhage	–	–	1	–	.25	–
Hodgkin's disease	–	–	1	–	.25	–
	398	298	398	298	–	–

TABLE 3.—*Civil Condition of Patients Admitted*

	Males	Females	Totals
Single	74	80	154
Married	64	62	126
Widowed	12	2	14
Divorced	3	1	4
	153	145	298

TABLE 4.—*Ages of Patients Admitted*

	Males	Females	Total	Percentage
Under 20 years	13	17	30	10.07
20 to 29 years	58	82	140	46.98
30 to 39 years	39	32	71	23.83
40 to 49 years	29	10	39	13.09
50 to 59 years	11	2	13	4.36
60 to 69 years	2	2	4	1.34
70 and over	1	0	1	.33
Average age	33.63	27.63	30.71	–
	153	145	298	–

TABLE 5.—*Nativity and Parentage of Patients Admitted*

Places of Nativity	Males			Females			Totals		
	Patients	Fathers	Mothers	Patients	Fathers	Mothers	Patients	Fathers	Mothers
United States:									
Massachusetts	95	25	34	100	30	31	195	55	65
Other New England States	7	9	5	8	11	9	15	20	14
Other States	9	11	9	7	8	9	16	19	18
Total Native	111	45	48	115	49	49	226	94	97
Other Countries (25)									
Total Foreign	42	103	101	30	94	94	72	197	195
Unknown	–	5	4	–	2	2	–	7	6
Grand Totals	153	153	153	145	145	145	298	298	298

TABLE 6.—*Residences of Patients Admitted*

Place	No.	Place	No.	Place	No.	Place	No.
Arlington	3	Hatfield	1	Newton	2	Templeton	1
Auburn	2	Hinsdale	1	North Adams	2	Wakefield	1
Ayer	1	Holden	2	North Reading	1	Waltham	2
Belmont	4	Holyoke	23	Norwood	1	Watertown	3
Blackstone	1	Leicester	1	Orange	1	Wellesley	1
Boston	67	Lexington	1	Palmer	1	Westborough	1
Brookline	1	Littleton	1	Peabody	1	Westfield	8
Cambridge	10	Lowell	9	Pittsfield	2	West Springfield	1
Chelsea	22	Ludlow	2	Reading	2	Weymouth	1
Chicopee	8	Lynn	2	Revere	12	Wilbraham	1
Concord	1	Malden	1	Rutland	1	Wilmington	1
Easthampton	2	Marlborough	1	Shelburne	2	Winthrop	3
Erving	1	Maynard	2	Shrewsbury	1	Woburn	5
Everett	7	Medfield	1	Somerville	23	Worcester	3
Fitchburg	2	Medford	3	Southbridge	2		
Framingham	5	Milford	1	South Hadley	1	Total	298
Gardner	1	Milton	1	Southwick	1		
Great Barrington	2	Natick	3	Spencer	1		
Greenfield	2	New Bedford	2	Springfield	9		

TABLE 7.—*Stage of Disease on Admission*

	Males	Females	Totals	Percentages
Minimal	7	14	21	7.04
Moderately advanced	60	53	113	37.92
Far advanced	83	72	155	52.01
Unclassified	2	2	4	1.34
Childhood type	0	2	2	.67
Bronchiectasis and pulmonary tuberculosis	0	1	1	.34
Bronchiectasis	0	1	1	.34
Tuberculous empyema	1	0	1	.34
	153	145	298	–

TABLE 8.—*Condition on Discharge*

	Males	Females	Totals	Percentages
Apparently arrested	4	3	7	2.31
Quiescent	58	83	141	46.54
Improved	27	8	35	11.55
Unimproved	30	19	49	16.17
Dead	33	28	61	20.13
Not considered	5	2	7	2.31
Atelectasis and chronic pulmonary suppuration with question of tuberculosis	0	1	1	.33
Non-tuberculous	1	0	1	.33
Bronchiectasis	0	1	1	.33
	158	145	303	–

TABLE 9.—*Deaths*

Duration of Disease				Length of Residence at Sanatorium		
	Males	Females	Totals	Males	Females	Totals
Under 1 month	1	–	1	6	–	6
1 to 2 months	1	–	1	4	4	8
2 to 3 months	–	–	–	4	3	7
3 to 4 months	–	–	–	4	2	6
4 to 5 months	1	1	2	2	2	4
5 to 6 months	1	2	3	1	–	1
6 to 7 months	1	–	1	1	2	3
7 to 8 months	2	1	3	2	1	3
8 to 9 months	1	2	3	–	3	3
9 to 10 months	1	–	1	1	1	2
10 to 12 months	3	1	4	1	2	3
12 to 18 months	5	2	7	1	–	1
18 to 24 months	1	3	4	3	1	4
Over 2 years	15	16	31	3	7	10
	33	28	61	33	28	61

TABLE 10.—*Cause of Death*

	Males	Females	Totals
Pulmonary tuberculosis	30	26	56
Pulmonary tuberculosis and mixed empyema	–	1	1
Pulmonary tuberculosis, tuberculous empyema and endocarditis	1	–	1
Pulmonary tuberculosis, tuberculosis of spine and tuberculous meningitis	–	1	1
Pulmonary tuberculosis and tuberculous enteritis	1	–	1
Cancer of lung	1	–	1
	33	28	61

Financial Report, Rutland State Sanatorium, 1936

To the Department of Public Health:

I respectfully submit the following report of the finances of this institution for the fiscal year ending November 30, 1936.

Statement of Earnings

Board of patients:			
Private	$26,145 00		
Cities and towns	76,421 82		
Chelsea, Revere and Winthrop	40,050 71		
		$142,617 53	
Personal services:			
Reimbursement from Board of Retirement		$118 00	
Sales:			
Food	$397 14		
Furniture and household supplies	17 00		
Medical and general care	317 99		
Heat, light and power	40		
Farm	738 47		
Garage, stable and grounds	86 67		
Repairs, ordinary	12 00		
Total sales		$1,569 67	
Miscellaneous:			
Interest on bank balances	$1 88		
Rents	91 39		
Sanatorium Patients' Fund	125 82		
Total, miscellaneous		$219 09	
Total earnings for the year			$144,524 29
Total cash receipts reverting and transferred to the State Treasurer			$154,533 80
Accounts receivable outstanding Dec. 1, 1935		$73,752 58	
Accounts receivable outstanding Nov. 30, 1936		63,743 07	
Accounts receivable increased			$10,009 51

Maintenance Appropriation

Balance from previous year, brought forward		$11,273 07
Appropriation, current year	$353,150 00	
Additional for food	1,000 00	
Additional for personal services	4,555 00	
		358,705 00
Total		$369,978 07
Expenditures as follows:		
Personal services	$201,751 74	
Food	56,394 45	
Medical and general care	26,380 67	
Farm	13,399 39	
Heat, light and power	27,284 65	
Garage, stable and grounds	1,869 58	
Travel, transportation and office expenses	3,442 94	
Religious instruction	1,900 00	
Clothing and materials	199 23	
Furnishings and household supplies	9,962 31	
Repairs, ordinary	4,852 97	
Repairs and renewals	5,397 32	
Total maintenance expenditures		$352,835 25
Balance of maintenance appropriation, Nov. 30, 1936		$17,142 82
Estimated outstanding liabilities, Nov. 30, 1936		$12,951 22

Special Appropriations

Balance December 1, 1935, brought forward		$14,583 43
Appropriations for current year		450 00
Total		$15,033 43
Expended during the year (see statement below)	$11,804 58	
Reverting to Treasury of Commonwealth	* 36 45	
(Star balances below that are reverting)		11,841 03
Balance November 30, 1936, carried to next year		$3,192 40

Appropriation	Act or Resolve	Total Amount Appropriated	Expended during Fiscal Year	Total Expended to Date	Balance at End of Year
Sprinklers	Acts 1934 Chap. 162	$3,600 00	$137 18	$3,563 55	$36 45*
Reconstruction of Road	Acts 1935 Chap. 249	12,006 94	11,345 39	12,006 94	–
Emergency Public Works-Commission — Mass. State Projects — Docket 2275 — H-3 Boilers	–	37,000 00	322 01	34,257 60	2,742 40
Installation of Hydrants	Acts 1936 Item 601	450 00	–	–	450 00
	–	$53,056 94	$11,804 58	$49,828 09	$3,228 85 36 45 $3,192 40

Per Capita

During the year the average number of patients has been		368.8
Total cost of maintenance	$352,835 25	
Equal to a weekly per capita cost of (52 weeks to year)	18 39	
Total receipts for the year	154,533 80	
Equal to a weekly per capita of	8 05	
Total net cost of maintenance for year (total maintenance less total receipts)		$198,301 45
Net weekly per capita	10 34	

Respectfully submitted,

Mary A. Boyle, *Treasurer.*

Inventory, Rutland State Sanatorium

GRAND SUMMARY SHEET

November 30, 1936

Real Estate

Land, 364.727 acres	$27,182 94	
Buildings	651,197 42	
Betterments (additions and improvements)	177,691 61	
Total, Real Estate		$856,071 97

Personal Property Undistributed Supplies

Travel, transportation and office expenses	$589 80	
Food	3,634 64	
Clothing and materials	396 61	
Furnishings and household supplies	1,978 73	
Medical and general care	3,407 37	
Heat, light and power	1,155 96	
Farm	4,615 25	
Garage, stable and grounds	88 36	
Repairs	4,510 75	
		$20,377 47

Personal Property Distributed Supplies

Travel, transportation and office expenses	$1,932 23	
Clothing and materials	349 87	
Furnishings and household supplies	36,698 07	
Medical and general care	16,789 28	
Heat, light and power	1,084 11	
Farm	49,312 12	
Garage, stable and grounds	988 66	
Repairs	1,303 61	
Total		$108,457 95

Grand Summary

Real Estate—Total	$ 856,071 97	
Personal Property—Undistributed Supplies, Total	29,377 47	
Personal Property—Distributed Supplies, Total	108,457 95	
		$984,907 39

WESTFIELD STATE SANATORIUM

Resident Officers

Roy Morgan, M.D., *Superintendent.*
Heman B. Chase, M.D., *Assistant Superintendent.*
Eliot H. Luther, M.D., *Senior Physician.*
H. Victor Ascolillo, M.D., *Assistant Physician.*
James Lewis, M.D., *Assistant Physician.*
George E. Crowell, D.M.D., *Dentist.*
Bessie MacDonald, R.N., *Superintendent of Nurses and Matron.*
Josephine E. French, *Treasurer.*
John E. Kinsella, *Steward.*
William M. Wade, *Chief Engineer.*
William G. Atkinson, *Head Farmer.*

Non-Resident Officers

*Marshall M. Menzies, M.D., *Consultant in Diseases of Eyes, Ears, Nose and Throat.*
*John Pallo, M.D., *Consultant in Diseases of Eyes, Ears, Nose and Throat.*
A. D. Rood, M.D., *Consultant in Bronchoscopy.*

* Six months each.

Report of the Superintendent

To Dr. Henry D. Chadwick, *Commissioner, Department of Public Health:*

I have the honor to submit the twenty-seventh annual report of the Westfield State Sanatorium for the year ending November 30, 1936.

Financial Statement

During the year there has been expended $270,233.80 for maintenance, a gross weekly per capita cost of $24.74. There has been expended from Special Appropriations—Improving Water Supply, $3,469.41; Additional Fire Protection, $525.71; Enlarge Sewage Disposal System, $2,365.09, and from P.W.A. Docket No. 1155-Mass. Project-H 102—Cancer and Tuberculosis Hospital, $500,173.81.

There has been collected from miscellaneous sources (the total of all collections), $61,013.66. Deducting this amount from the gross maintenance expense leaves a net expense of $209,220.14, a net weekly per capita cost of $19.16. There has been collected from private sources $2,039 and from cities and towns $56,225.50.

Of the 108 patients admitted during the year, 4 cases were supported wholly or in part from private funds; 64 cases by cities and towns; 15 wholly by the State, and 9 by the Department of Public Welfare, Division of Child Guardianship. There were 16 cases on which settlements have not been determined.

Population

There were 210 patients in the sanatorium at the beginning of the year and 186 at the close. The largest number of patients at any one time was 234 and the smallest number was 181. The daily average number of patients was 210.2. There were 108 patients admitted during the year and 132 were discharged, including deaths. Seventy-one cases were admitted from cities and towns of over 25,000 population and 37 from cities and towns of less than 25,000. The average age of patients was 11.7 years. The average length of stay of patients discharged, including deaths, was 576.3 days. Of the 132 discharged cases, 16 were apparently well, 73 apparently arrested, 17 improved, 18 unimproved and 8 deaths. Of the discharged patients, 115 gained 1,964 pounds. Hospital days of patients was 76,938. The average number of employees and officers during the year was 165.

Medical Report

There has been no change in our medical treatment except that we have been using collapse therapy more than ever. Artificial pneumothorax has been used in 65 cases, 1,315 injections being given. In addition to our own patients, we have continued artificial pneumothorax treatments on 28 cases discharged from other sanatoria, giving them 405 injections.

Of the patients discharged during the year, 25 had adult-type pulmonary tuberculosis. Sixteen of these received collapse therapy during their residencies; 14 received pneumothorax alone and 2 received pneumothorax and had phrenics.

We have been very fortunate in that we have not had a single case of contagious disease during the year.

We have continued to hold our monthly Consultation Clinics in Great Barrington, Greenfield and North Adams. Our out-patient work has been continued with no change.

Figures for these activities are given in the following table:

	Negative		Suspicious		Positive		Total
	New	Re-exam.	New	Re-exam.	New	Re-exam.	
Consultation . .	348	183	11	2	28	93	665
Out-Patient . .	1,302	276	200	111	136	272	2,297

In cooperation with the Hampden County Tuberculosis Association we have furnished them medical service for 2 adult clinics in which 107 patients were examined and x-rayed. We have also furnished medical service for their Summer Camp. All the camp children were tested; all the reactors were x-rayed and physical examination made whenever indicated.

School Clinics have been continued in Berkshire, Franklin and Hampden Counties. Last June marked the completion of the second school year of this work. A detailed report of this work was submitted at that time. Twenty-seven cities and towns were covered. Total enrollment in these schools (in the 7th, 9th and 11th grades) was 22,837. Eleven thousand, six hundred and eleven pupils or 51% were tested. The percentage of reactors was 16. Two thousand and one were x-rayed and 157 physical examinations were made. The findings were Adult Type Tuberculosis, 2; Adult Type Observation, 2; Childhood Type, 0; and Childhood Type Observation, 152.

In addition to the above work, we have conducted x-ray surveys as follows: State College, Amherst, 445 films and State Teachers College, Westfield, 48 films and State Teachers College, North Adams, 31 films.

Institution Activities

Lectures on Childhood Tuberculosis were delivered before the following groups: National Youth Administration of West Springfield; Nurses of Wesson Memorial Hospital; two classes from Harvard School of Public Health and the Women's Club of Greenfield. A paper on Adolescent Tuberculosis was read at the Annual Meeting of the State Medical Society. On June 1st the regular Annual Conference of Western Massachusetts Health Officials was held at the Institution. The attendance was 150.

Personnel Changes

Dr. Howard Newell resigned in June to go into private practice. His place was taken by Dr. James Lewis. Dr. Charles Gill resigned in September after two years of very efficient work in charge of the School Clinics. This position has been left vacant. In October, Mrs. S. Ellen Almeida was employed as Tuberculosis Field Nurse to supervise the School Clinics. We suffered a great loss through the death on November 7th of Benjamin J. Sandiford, our Chief Engineer. Mr. Sandiford was with us for 20 years and was an outstanding man in professional ability and also in personality. This vacancy was filled by the promotion of Morgan Wade, who has been in our Engineering Staff for the past 15 years.

Improvements and Changes

We have been very busy on the work under P.W.A. Docket No. 1155—Mass. State Project H-102. This provides for the building and equipping of a Hospital Building of 200 beds, a Nurses' Home of 146 beds, a Store Room and Additions and Alterations to the Power Plant and Laundry. The Store Room has been completed but the rest of the program has proceeded rather slowly. These buildings will probably be equipped and ready to be occupied in August or September, 1937.

The old laundry has been considerably improved by the addition of a new washer, extractor and press. The old ceiling has also been replaced. A new dish washer has been purchased but has not been delivered.

Recommendations

Our present Pasteurizing Room is in poor condition and ought to be rebuilt. A new washer, flat work ironer and hot water heater are needed in the laundry. When the new buildings are done, the first floor of the Administration Building will be left practically vacant. I would recommend that this be remodeled to make two suites for members of the Medical Staff. There are a few other minor items which have been included in our budget under Repairs and Renewals. The budget also includes a number of items for the improvement of water supply, etc., as recommended by the Engineering Division.

Acknowledgments

I am deeply indebted to the personnel of the Institution for their continued loyalty and efficiency; also to you and the Department for your counsel and support.

Surgical Report

The following operations have been performed at the Sanatorium: Tonsillectomy and adenectomy, 18; artificial pneumothorax treatments, 1,720; pneumolysis, 14; phrenics, 3; and open pneumothorax, 1.

Laboratory Report

Blood	
1. Clinical Pathology	
Cell counts	414
Bleeding and clotting time	18
Sputum	
Smears for tubercle bacilli	960
Urine	
Routine analyses	871
Feces	10
Stomach Contents	
Gastric washings	30
Animal inoculations	30
Guinea pigs autopsied	30
Gram stains	15
Fontana's stain for spirochetes	12
Miscellaneous	8
Total	2,398

Dental Report

The following table shows the work done in the Dental Clinic during the year: Prophylactic treatments, 296; fillings—permanent teeth, 1,648; fillings—temporary teeth, 84; extractions—permanent teeth, 110; extractions—temporary teeth, 79; treatments, 67; restorations, 2; x-rays, 21; irrigations, 4; dental examinations, 129.

Total number of operations, 2,440.

Visits, 1,966; new patients, 22; dismissals, 242.

School Report

Average daily attendance from December, 1935, to December, 1936:

Grade I	16.48	Grade VI	15.00
Grade II	13.87	Grade VII	13.72
Grade III	11.51	Grade VIII	9.5
Grade IV	14.18	High school grades	6.9
Grade V	16.34	Manual training	8.48
Total average attendance			125.98
Total enrollment			187

Respectfully submitted,

Roy Morgan, M.D.,
Superintendent.

Statistical Tables

Table 1.—*Admissions and Discharges*

	Males	Females	Totals
Patients in Sanatorium November 30, 1935	98	112	210
Patients admitted December 1, 1935, to November 30, 1936 (incl.)	56	52	108
Patients discharged December 1, 1935, to November 30, 1936 (incl.)	65	67	132
Deaths (included in number discharged)	4	4	8
Patients remaining in Sanatorium November 30, 1936	89	97	186
Daily average number of patients	99.1	111.1	210.2

Table 2.—*Classification on Admission*

	Classification on Application Blanks		Our Classification on Admission		Per Cent	
	1935	1936	1935	1936	1935	1936
Advanced	5	8	5	6	4.1	5.6
Asthma	–	–	–	3	–	2.8
Bronchiectasis	–	–	–	1	–	.9
Bronchopneumonia	–	–	1	–	.8	–
Cervical adenitis (tuberculous)	–	1	1	2	.8	1.8
Childhood tuberculosis	65	40	60	45	48.4	41.7
Childhood type (infiltrative)	–	1	4	1	3.2	.9
Chorea	–	–	1	–	.8	–
Malnutrition	–	–	10	6	8.1	5.6
Miliary tuberculosis	–	–	–	3	–	2.8
Minimal	27	19	13	10	10.5	9.3
Moderately advanced	12	15	14	21	11.3	19.5
No disease	–	–	6	2	4.8	1.8
Non pulmonary	1	–	–	–	–	–
Pleurisy with effusion	1	5	6	5	4.8	4.6
Potts' disease	–	–	–	1	–	.9
Rheumatic arthritis	–	–	–	1	–	.9
Suspicious	–	1	–	–	–	–
Tuberculous glands of neck	–	1	–	–	–	–
Tuberculous hip	–	–	–	1	–	.9
Unclassified	13	17	3	–	2.4	–
	124	108	124	108	100.00	100.00

Table 3.—*Civil Condition of Patients Admitted*

	Males	Females	Totals
Single	.56	52	108

Table 4.—*Ages of Patients Admitted*

	Males	Females	Totals	Percentages
Under 5 years	6	8	14	13.0
5 to 9 years	12	10	22	20.4
10 to 14 years	23	13	36	33.3
15 to 19 years	14	20	34	31.5
20 years and over	1	1	2	1.8
	56	52	108	100.00

Average age 11.7 years.

TABLE 5.—*Nativity and Parentage of Patients Admitted*

Places of Nativity	Males			Females			Totals		
	Patients	Fathers	Mothers	Patients	Fathers	Mothers	Patients	Fathers	Mothers
United States:									
Massachusetts	48	22	25	47	17	18	95	39	43
Other New England States	3	4	3	2	4	5	5	8	8
Other States	3	3	4	3	4	4	6	7	8
Total Native	54	29	32	52	25	27	106	54	59
Foreign Countries:									
Albania	0	0	0	0	1	1	0	1	1
Armenia	0	1	1	0	0	0	0	1	1
Austria	0	2	2	0	0	0	0	2	2
Azores	0	1	0	0	0	0	0	1	0
Canada	1	5	6	0	11	8	1	16	14
Cape Verde Islands	0	2	2	0	0	0	0	2	2
England	0	1	0	0	0	1	0	1	1
Finland	0	0	0	0	1	1	0	1	1
Ireland	0	3	1	0	2	2	0	5	3
Italy	1	5	5	0	1	2	1	6	7
Poland	0	5	7	0	6	6	0	11	13
Russia	0	0	0	0	3	2	0	3	2
Spain	0	0	0	0	1	1	0	1	1
Sweden	0	0	0	0	1	1	0	1	1
Total, Foreign Countries	2	25	24	0	27	25	2	52	49
Unknown	0	2	0	0	0	0	0	2	0
Total	2	27	24	0	27	25	2	54	49
Total Native	54	29	32	52	25	27	106	54	59
Grand Total	56	56	56	52	52	52	108	108	108

TABLE 6.—*Residence of Patients Admitted*

Place	No.	Place	No.	Place	No.	Place	No.
Adams	2	Dudley	2	Marlborough	2	Uxbridge	1
Athol	2	Easthampton	1	Palmer	1	Waltham	1
Becket	1	Falmouth	1	Pittsfield	9	Webster	1
Boston	2	Fitchburg	20	Russell	1	Westfield	3
Cambridge	1	Gardner	1	Sherborn	1	Westhampton	1
Chicopee	11	Hancock	1	Southbridge	5	Wilbraham	1
Cummington	1	Holyoke	7	Springfield	18	Worcester	1
Dalton	1	Hudson	1	Sunderland	3		
Dartmouth	1	Leominster	2	Taunton	1	Total	108

TABLE 7.—*Stage of Disease on Admission*

	Males	Females	Totals	Percentages
Advanced	3	3	6	5.6
Asthma	3	0	3	2.8
Bronchiectasis	1	0	1	.9
Cervical adenitis (tuberculous)	1	1	2	1.8
Childhood tuberculosis	22	23	45	41.7
Childhood type (infiltrative)	0	1	1	.9
Malnutrition	3	3	6	5.6
Miliary tuberculosis	3	0	3	2.8
Minimal	7	3	10	9.3
Moderately advanced	8	13	21	19.5
No disease	0	2	2	1.8
Pleurisy with effusion	3	2	5	4.6
Pott's disease	1	0	1	.9
Rheumatic arthritis	0	1	1	.9
Tuberculous hip	1	0	1	.9
	56	52	108	100.00

TABLE 8.—*Condition on Discharge*

	Males	Females	Totals	Percentages
Apparently arrested	35	38	73	55.3
Apparently well	7	9	16	12.1
Died	4	4	8	6.1
Improved	9	8	17	12.9
Unimproved	10	8	18	13.6
	65	67	132	100.00

TABLE 9.—*Deaths, by Length of Residence, at Sanatorium*

Duration of Disease	Males	Females	Totals	Length of Residence at Sanatorium		
				Males	Females	Totals
Under 1 month	1	0	1	1	1	2
2 to 4 months	1	1	2	2	0	2
6 to 8 months	2	1	3	0	1	1
Over 2 years	0	2	2	1	2	3
	4	4	8	4	4	8

TABLE 10.—*Causes of Death*

	Males	Females	Totals
Pulmonary tuberculosis	1	4	5
Miliary tuberculosis	2	0	2
Bronchopneumonia	1	0	1
Total	4	4	8

Financial Report, Westfield State Sanatorium, 1936

To the Department of Public Health:

I respectfully submit the following report of the finances of this institution for the fiscal year ending November 30, 1936:

STATEMENT OF EARNINGS

Board of patients:			
Private	$2,039 00		
Cities and towns	56,225 50		
		$58,264 50	
Personal services:			
Reimbursement from Board of Retirement		$90 00	
Sales:			
Food	582 83		
Clothing and materials	499 50		
Medical and general care	65 25		
Heat, light and power	5 00		
Farm	1,110 92		
Arts and crafts sale	60 25		
Total sales		$2,323 75	
Miscellaneous:			
Rents	$119 91		
Total, miscellaneous		$119 91	
Total earnings for the year			$60,798 16
Total cash receipts reverting and transferred to the State Treasurer			$61,013 66
Accounts receivable outstanding Dec. 1, 1935		$16,833 00	
Accounts receivable outstanding Nov. 30, 1936		16,617 50	
Accounts receivable decreased			$215 50

MAINTENANCE APPROPRIATION

Balance from previous year, brought forward		$5,035 92
Appropriation, current year	$280,980 00	
Supplementary budget	1,800 00	
Salary increases	2,535 00	
		285,315 00
Total		$290,350 92

Expenditures as follows:		
Personal services	$173,642 37	
Food	32,455 96	
Medical and general care	8,756 76	
Farm	9,846 03	
Heat, light and power	17,708 56	
Garage, stable and grounds	2,490 50	
Travel, transportation and office expenses	4,170 44	
Religious instruction	1,130 00	
Clothing and materials	2,770 44	
Furnishings and household supplies	6,206 19	
Repairs, ordinary	4,123 89	
Repairs and renewals	6,932 66	
Total maintenance expenditures		$270,233 80
Balance of maintenance appropriation, Nov. 30, 1936		$20,117 12
Estimated outstanding liabilities, Nov. 30, 1936		$12,460 46

Special Appropriations

Balance December 1, 1936, brought forward		$900,173 67
Appropriations for current year		64,394 00
Total		$964,567 67
Expended during the year (see statement below)	$506,534 02	
		506,534 02
Balance November 30, 1936, carried to next year		$458,033 65

Appropriation	Act or Resolve	Total Amount Appropriated	Expended during Fiscal Year	Total Expended to Date	Balance at End of Year
Improvement Water Supply System Chap. 304—Item 603	1936	$6,500 00	$3,469 41	$4,942 28	$1,557 72
Fire Protection and Sprinklers Chap. 304—Item 604	1936	3,394 00	525 71	1,391 47	2,002 53
Enlarge Sewage Disposal System Chap. 304—Item 605	1936	7,400 00	2,365 09	2,365 09	5,034 91
E.P.W. Construction P.W.A. Docket 1155 Mass. Project H-102	1935	950,000 00	500,173 81	500,561 51	449,438 49
Cancer and T.B. Group Totals		$967,294 00	$506,534 02	$509,260 35	$458,033 65

Per Capita

During the year the average number of patients has been		210.02
Total cost of maintenance	270,233 80	
Equal to a weekly per capita cost of (52 weeks to year)	24 74	
Total receipts for the year	$61,013 66	
Equal to a weekly per capita of	5 58	
Total net cost of maintenance for year (total maintenance less total receipts)		$209,220 14
Net weekly per capita	19 16	

Respectfully submitted,

Josephine E. French,
Treasurer.

Inventory, Westfield State Sanatorium

GRAND SUMMARY SHEET

November 30, 1936

Real Estate

Land, 266.7 acres	$11,021 00	
Buildings	445,786 96	
Betterments (additions and improvements)	12,915 10	
Total, Real Estate		$469,723 06

Personal Property Undistributed Supplies

Travel, transportation and office expenses	$350 00	
Food	2,915 49	
Clothing and materials	3,373 18	
Furnishings and household supplies	2,741 09	
Medical and general care	1,164 38	
Heat, light and power	993 25	
Farm	1,968 39	
Garage, stable and grounds	85 50	
Repairs	26 54	
		$13,617 82

Personal Property Distributed Supplies

Travel, transportation and office expenses	$4,136 32	
Clothing and materials	967 10	
Furnishings and household supplies	40,958 60	
Medical and general care	44,294 61	
Heat, light and power	3,594 68	
Farm	33,194 34	
Garage, stable and grounds	7,723 60	
Repairs	2,578 72	
Total		$137,447 97

Grand Summary

Real Estate—Total	$469,723 06	
Personal Property—Undistributed Supplies, Total	13,617 82	
Personal Property—Distributed Supplies, Total	137,447 97	
		$620,788 85

PONDVILLE HOSPITAL

Resident Officers

George L. Parker, M.D., *Superintendent.*
Weston T. Buddington, M.D., *Assistant Superintendent.*
Stanford W. Hopkins, M.D., *Assistant Physician.*
Richard G. Whiting, M.D., *Assistant Physician.*
Adolph Meltzer, M.D., *Assistant Physician.*
Rutledge S. Lampson, M.D., *Assistant Physician.*
Donald S. Adams, M.D., *Assistant Physician.*
Lauren V. Ackerman, M.D., *Pathologist.*
Robert Schrek, M.D., *Pathologist.*
Dorothy Z. Silver, R.N., *Principal of School of Nursing.*
Marion MacKenzie, *Treasurer.*
Catherine Hayes, *Dietitian.*
Florence Mullen, *Head Housekeeper.*
Neil Fountain, *Head Social Service Worker.*
Ernest L. Gage, *Chief Power Plant Engineer.*
John Lang, *Carpenter.*
Jesse A. Samples, *Groundskeeper.*
Niel Nelson, *Head of Garage.*

Non-Resident Officers

Ernest M. Daland, M.D., *Surgeon and Chief.*
Grantley W. Taylor, M.D., *Surgeon.*
Horatio Rogers, M.D., *Surgeon.*
Richard H. Wallace, M.D., *Assistant Surgeon.*
Clifford Franseen, M.D., *Assistant Surgeon, OPD.*
Joe Vincent Meigs, M.D., *Gynecologist.*
Langdon Parsons, M.D., *Assistant Gynecologist.*
Roger C. Graves, M.D., *Urologist.*
Charles J. E. Kickham, M.D., *Assistant Urologist.*
John S. Hodgson, M.D., *Neurological Surgeon.*
Richard H. Norton, D.M.D., *Oral Surgeon.*
Carl Ernlund, M.D., *Laryngologist.*
Henry Jackson, Jr., M.D., *Physician.*
Dudley Merrill, M.D., *Assistant Physician.*
Maxwell Finland, M.D., *Assistant Physician.*
Arthur W. Greenwood, M.D., *Dermatologist.*

Hugo B. C. Riemer, M.D., *Ophthalmologist.*
Richard Dresser, M.D., *Roentgenologist.*
Charles A. Dumas, M.D., *Assistant Roentgenologist.*
Harry W. Harding, D.M.D., *Dentist.*
James C. Hudson, Ph.D., *Physicist.*
Shields Warren, M.D., *Pathologist.*
Olive Gates, M.D., *Assistant Pathologist.*
Sidney C. Wiggin, M.D., *Anesthetist.*
F. H. L. Taylor, Ph.D., *Physiological Chemist.*

Report of the Superintendent

To Henry D. Chadwick, M.D., *Commissioner, Department of Public Health:*

I have the honor to submit the tenth annual report of the Pondville Hospital (Norfolk), P. O. Wrentham, Massachusetts, for the year ending November 30, 1936.

Financial Statement

During the year, there has been expended for maintenance $332,423.80, a gross weekly per capita cost of $49.87. There has been collected from miscellaneous sources $86,747.55 (the total of all collections). Deducting this amount from the gross maintenance leaves a net expense of $245,676.25. The net weekly per capita cost was $36.85. There has been collected from private patients $29,189.59, from cities and towns $49,142.27, from the out-patient department $1,080.00, from accident cases $24.50, from miscellaneous sales and other sources $751.34, and reimbursement from the State Board of Retirement $86.00.

Six hundred and five patients were supported by private funds, 547 by cities and towns, and 53 by the State, leaving 77 settlements pending.

There has been expended from Special Appropriations allotted under the Acts of 1935 Installation of Incinerator $325.51, Moving and Improving Bacteriological Laboratory $1,990.94, Engine and Generator Reconditioning and Installing $2,378.20, Service Building Renovations, etc. $11,670.53, Additional Water Supply and Sprinklers $1,489.60, Generation of Power Improvements $17,885.68. There has been expended from Special Appropriations allotted under the Acts of 1936, Improvements Water Supply System $262.88, Improvements Sewage Disposal $935.42. There has been expended from P.W.A. funds for an addition to present hospital building including furnishings and equipment, P.W.A. Docket 4200, Massachusetts State Project H-6 $16,569.40, and for New Service Building including furnishings and equipment, P.W.A. Docket 4476, Massachusetts State Project H-5 $38,808.98.

Population

There were 110 patients in the hospital on November 30, 1935. During the year, there were 1,474 admissions. Of these, 510 represented readmissions. Patients were received from 173 cities and towns. Patients were also received from 15 other State institutions. One hundred and thirty-four patients remained in the hospital at the end of the year.

Discharges during the year numbered 1,450. The condition of 338 was the same, 864 improved and 248 died. There were 166 autopsies.

The average period of hospitalization was 33.3 days. The smallest number in the hospital on any one day was 81; the largest number, 143. The average number of patients per day was 128.2.

The daily average number of officers and employees was 190.37.

Medical Report

During the period from January 20 to February 15, an epidemic of an acute upper respiratory tract infection occurred among thirty of our employees. It was necessary to discharge all the patients on wards E and F in order to accommodate these sick employees. All admissions and operative work except emergencies were discontinued during the epidemic. This situation was investigated by Dr. Alton S. Pope, Director of the Division of Tuberculosis, and Dr. B. Barrett Gilman, Epidemiologist, of the Department of Public Health.

Irrespective of this epidemic, our number of major operations increased 35%, the total number of operations increased 30%, and the number of surgical specimens handled by the pathological department increased 31%. Autopsies have increased 27%, while the number of deaths has increased 18%. Admissions and discharges have increased 24%. The average length of hospitalization was 33.3. This is one day less than the average length of hospitalization last year, and, in spite of the rapid turnover since the epidemic, there has been no reduction in our waiting list.

The weekly clinics at the hospital were continued during the year with 52 clinics held. Visits to the regular Thursday clinic numbered 3,264, with an average attendance of 63. Patients making their first visit to the clinic numbered 965. Out-patient visits, other than the regular Thursday clinic, numbered 1,727. Of these, 92 were new patients. The total clinic visits were 4,991. There were 433 clinic patients who subsequently were admitted to the hospital.

X-ray and Radium:

Diagnostic x-ray plates taken, 5,337; fluoroscopic examinations, 546; x-ray treatments given, 4,957; radium treatments, 515.

Surgical Reports

Operations: Major, 529; minor, 844; procedures without anesthetics, 975. Total procedures, 2,348. Of these procedures, 546 were biopsies, 18 bronchoscopies, 374 cystoscopies, 15 esophagoscopies, 24 laryngoscopies, 84 proctoscopies, and 162 transfusions.

An anesthetic was given 1,432 times: Avertin, 16; caudal, 12; cocain, 63; ether, 56; ethyl chloride, 2; evipal, 98; gas-oxygen, 61; gas-oxygen-ether, 414; novocain, 639; pantocain, 7; rectal evipal, 5; spinal, 63.

Laboratory Report

Blood

1. Clinical Pathology

R.B.C. counts	1,910
W.B.C. counts	2,280
Differential counts	1,317
Hemoglobin estimations	2,202
Sedimentation tests	6
Hematocrit	5
Icterus index	81
Clot retraction time	4
Clotting time	18
Bleeding time	18
Van der Bergh tests	9
Platelet counts	13
Reticulocyte counts	29
Fragility R.B.C.	2
Takata-Ara tests	18

2. Chemistry

Sugar	184
N.P.N.	1,814
Chlorides	87
Glucose tolerance tests	4
Albumen-globulin ratio	87
Amino acids	1
Calcium	9
Phosphorus	8
Total protein	88
Urea	1
Uric acid	3

3. Bacteriology and Serology	
Culture	24
Grouping	492
Matching	392
Hintons and Wassermanns	1,341
Complement fixation for G.C.	2
Malarial parasites	1
Sputum	
Examinations	79
Spinal Fluids	
Cell counts	2
Pandy's tests	9
Ross Jones tests	5
Ammonium sulphate	3
Urine	
Routine analyses	8,097
Renal function	611
Concentration test	3
Bence Jones tests	8
Mosenthal tests	1
Arsenic tests	1
Feces	491
Stomach Contents	
Routine analyses	26
Vomitus	1
Surgical specimens	1,383
Bacteriological smears	111
Bacteriological cultures	89
Microscopic sections (frozen)	99
Vincent's smears	7
B.M.R.	85
Vital capacity	1
Water cultures	9
Total	23,571

Dental Report

Prophylactic treatments, 103; extractions (permanent teeth), 676; treatments, 268; x-ray examinations, 225; examinations, 864. Total, 2,136. Total number of visits, 1,398; total number of new patients, 866.

Institution Activities

The following program of conferences and meetings were held during the year:

January 8—Group of students from Middlesex Medical College.

June 17—Conference of the Committee on Drug Addiction of the National Research Council. This conference was held for a further discussion of the use of morphine derivatives in the treatment of patients suffering from cancer.

Staff meetings for the discussion of cases were held monthly for the visiting and resident medical and surgical staff.

Weekly lectures by members of the visiting staff have made the work more interesting for the resident physicians.

The employees have continued to enjoy the use of the bowling alleys at the Wrentham State School through the courtesy of the superintendent of that institution.

Good fellowship has been stimulated among our employees by motion pictures, tennis, dances and the activities of our local baseball team.

Personnel Changes

The following appointments on the staff were made during the year:

Dr. Lauren V. Ackerman and Dr. Robert Schrek were appointed resident pathologists to succeed Dr. Robert Fienberg and Dr. Dale R. Coman. Dr. Eugene A. Gaston and Dr. Adolph Meltzer were appointed to succeed Dr. Paul Hinchey and Dr. David Monahan. Dr. Stanford W. Hopkins and Dr. Rutledge S. Lampson were appointed to succeed Dr. Jesse Parker and Dr. Eugene A. Gaston. Dr. Leonard Brewer was appointed to succeed Dr. William H. Roper. Dr. Brewer subsequently resigned and was succeeded by Dr. Thornton Scott. Dr. Scott subsequently resigned and was succeeded by Dr. Richard G. Whiting. The vacancy caused by the transfer of Dr. Weston T. Buddington to the position of Assistant Superintendent was filled by Dr. Donald S. Adams. Dr. Raymond E. Militzer, after a period of four years of excellent service as assistant superintendent, resigned to enter private practice. The position of assistant visiting pathologist was filled by Dr. Olive Gates and the position of visiting anesthetist by Dr. Sidney C. Wiggin. Dr. Clifford C. Franseen was appointed to succeed Dr. Valmore A. Pelletier. Miss Eleanor D. Upham who had been with us for several years as dietitian resigned and was succeeded by Miss Catherine E. Hayes. The position of pharmacist was filled by Miss Stephanie Podzunas and the position of bacteriological laboratory technician by Miss Mary Fleming. Thirty-two employees were added to our official family when our new buildings were opened: Two medical; 2 administration; 5 kitchen; 7 domestic; and 16 ward services.

Improvements and Changes

The completion of our new hospital addition and service building has added greatly to the efficiency of our surgical, out-patient and dietary departments.

The transfer of the pharmacy to the basement has made possible the accommodation of two additional male patients.

An adequately equipped bacteriological laboratory has been opened and the autopsy department enlarged.

Repairs have been made on the porch roofs of the administration building. The entrance to the administration building has been improved by the planting of small trees and shrubbery.

A new radio system, centrally controlled, has been installed for the benefit of the patients.

A new oil-cooled deep x-ray therapy apparatus and a deep x-ray therapy shock-proof machine has been added to our x-ray department.

The new service building has acquired a new dishwashing unit and a silex system for serving hot coffee has been put in two wards. The diet kitchens on wards C and D have been enlarged to meet the demands of additional patients.

The old service building has been renovated and furnished to accommodate the resident staff and other employees.

The three boilers in our power plant have been temporarily reset, an additional generator purchased and a new switchboard installed. The Ridgeway generator has been renovated and connection made with the line of the Edison Electric Light and Illuminating Company for x-ray service. Two new electric cables have been laid from the power plant to the hospital buildings.

The cement retaining wall in the rear of the new service building has been nearly completed.

The walls of the filter beds damaged by the spring freshet have been repaired and eight other beds resanded.

The water tank on the hill was cleaned, caulked and painted during the summer.

A new Buick sedan has replaced our old one and an International tractor added to our garage equipment.

Miscellaneous: Safety ironing equipment has been installed in three additional employees' cottages. Plastering has been done through the hospital and employees' cottages wherever the need was urgent and plumbing equipment such as pipes and antiquated radiator valves have been replaced. Floors in the hospital building and employees' cottages in need of sanitary covering have been laid with linoleum. Such equipment as surgical instruments, beds, mattresses. linens, filing cabinets, laboratory apparatus, fire hose, etc., have been replaced where necessary.

Recommendations

Condemnation of our recreation building by the Department of Public Safety has eliminated the parties and dances formerly enjoyed by employees and the motion pictures enjoyed by both patients and employees. This situation should be remedied because of the depressing nature of our hospital work which can be offset only by a sufficient amount of recreation and the isolation of the hospital which makes recreation impossible for the employee who does not own a car. Many of the offices in our administration building are too crowded for efficiency. A new administration building with business and executive offices, pathological, bacteriological and biological departments, an animal research laboratory and a recreation hall would not only present a solution of our problem but would give us the old building to use for fifteen additional beds and a much-needed record office space.

The housing accommodations for employees have not expanded with the enlargement of the hospital and the increase in personnel, and I again respectfully request the construction of a 100-bed nurses' dormitory which would solve our present housing problem.

Fire protection has not been provided for the "white house" because of insufficient funds. For the safety of the employees who reside in this building, I respectfully request that an allowance for fire protection be made.

The boilers in our power plant have been in operation for at least twenty-five years and the equipment is inefficient. Although the settings were temporarily repaired this year, the available funds were insufficient to thoroughly complete the task. I strongly urge that an allowance be made to thoroughly rectify this situation.

Our present garage accommodations are inadequate. I recommend that a garage be constructed for the use of employees who own cars. A monthly assessment for each car would eventually make the project self-sustaining.

Through the courtesy of the Department of Public Works, a survey of our roads, sidewalks, parking space and road lighting facilities was made. Under W.P.A. funds some of the road work was done around the employees' cottages but funds were insufficient to complete it. Our roads have long been in urgent need of repair and I earnestly request that an allowance be made to do at least a portion of the work this year.

The type of work at this institution makes heavy demands on our medical and surgical supplies and apparatus. In addition to the general maintenance for 1937, it is essential that new equipment and apparatus be purchased for both surgical and out-patient departments. I respectfully request sufficient funds to meet these requirements.

The porches on the new hospital wing should be glassed in. The extreme cold of last winter made sufficient heating of the rooms in this wing impossible with ensuing complaints of cold from both patients and employees. In spite of the weather-stripping of windows and doors, the rooms have been cold and drafty during the severely cold weather of this winter and I strongly recommend that these porches be glassed in as soon as possible.

Although some of the permanent equipment was replaced this year, the situation still is most unsatisfactory. New lavatory pipes and fixtures are needed in wards and cottages and I earnestly request an allowance to replace this equipment.

The appropriation allotted for new floor coverings this year was insufficient to complete the replacement of floors and coverings throughout the hospital buildings and employees' living quarters. Because of the ultimate economy in maintenance, I hereby request that an appropriation be made to continue these replacements.

The roofs of many of our present buildings need to be repaired. The asbestos shingles now covering the pitch roofs present an unsatisfactory appearance when patched and do not prevent leakage. I, therefore, respectfully request that an allowance be made for replacement, especially that of the administration building which is most in need of repair.

ACKNOWLEDGMENTS

I am greatly indebted to the Rev. Father Mitchell, the Rev. Father Fallon, the Rev. Father Reilly, and the Rev. Melville Shafer who have ministered so faithfully to the spiritual needs of our patients throughout the year. It was with regret that we learned of the transfer of the Rev. Father Hagan from the Wrentham parish. Both patients and employees felt a personal loss in his departure.

Again I wish to express my appreciation to the members of the Social Service Committee and to the Ladies' Society of the Wrentham Congregational Church who have, as usual, given so freely of their time and resources in maintaining the happiness of our patients. I am deeply grateful to the numerous groups of choir singers who have rendered musical programs for our patients.

I wish to offer my sincere thanks and appreciation to those loyal and faithful employees who have helped to carry on the work during the year.

I wish to thank you and the other members of the Department for your confidence and assistance throughout the year.

Respectfully submitted,

GEORGE L. PARKER, M.D.,
Superintendent.

Articles by Pondville Hospital Staff published during the fiscal year November 30, 1935, to December 1, 1936, will be found on page 26.

Statistical Tables

TABLE 1.—*Admissions and Discharges*

	Males	Females	Totals
Patients in hospital December 1, 1935	57	53	110
Patients admitted from December 1, 1935, to November 30, 1936, inclusive	666	808	1,474
Patients discharged from December 1, 1935, to November 30, 1936, inclusive	656	794	1,450
Patients remaining in hospital November 30, 1936	67	67	134
Daily average number of patients	64.2	64.0	128.2
Deaths (included in number discharged)	142	106	248

TABLE 2.—*Readmissions*

	Males	Females	Totals
Total patients treated	723	861	1,584
Less old patients readmitted first time since December 1, 1935	85	123	208
Less other readmissions	156	146	302
Less patients in hospital December 1, 1935	57	53	110
Number new patients admitted from December 1, 1935, to November 30, 1936	425	539	964
Total number different patients treated December 1, 1935, to November 30, 1936	567	715	1,282

TABLE 3.—*Civil Condition of New Patients Admitted*

	Males	Females	Totals
Single	72	70	142
Married	238	315	553
Widowed	96	135	231
Divorced	10	13	23
Separated	9	6	15
Totals	425	539	964

TABLE 4.—*Age of New Patients Admitted*

	Males	Females	Totals
Under 20 years	3	2	5
20 to 29 years	8	25	33
30 to 39 years	19	66	85
40 to 49 years	54	133	187
50 to 59 years	77	142	219
60 to 69 years	129	106	235
70 to 79 years	106	51	157
80 to 89 years	29	13	42
90 to 99 years	0	1	1
Totals	425	539	964

Table 5.—*Nativity of New Patients Admitted*

	Males	Females	Totals
United States	256	345	601
Albania	2	1	3
Alsace Lorraine	0	1	1
Austria	1	2	3
British West Indies	0	1	1
Bulgaria	1	0	1
Canada	44	70	114
Denmark	3	0	3
Dutch West Indies	1	0	1
England	22	18	40
Finland	2	3	5
France	1	0	1
Germany	3	5	8
Greece	1	1	2
Holland	1	1	2
Ireland	31	21	52
Italy	16	19	35
Lithuania	3	2	5
Newfoundland	0	4	4
Norway	0	3	3
Poland	12	11	23
Portugal	4	9	13
Russia	11	5	16
Scotland	5	7	12
Sweden	3	10	13
Switzerland	1	0	1
Wales	1	0	1
Totals	425	539	964

Table 6.—*Residence of New Patients Admitted*

Abington	3	Foxborough	11	Merrimac	1	Somerville	7
Adams	1	Framingham	6	Methuen	5	Southbridge	1
Agawam	2	Franklin	19	Middleborough	10	South Hadley	1
Amesbury	2	Gardner	10	Milford	17	Southwick	2
Amherst	2	Gloucester	1	Millis	5	Springfield	41
Arlington	3	Grafton	2	Millville	1	Stockbridge	1
Ashby	2	Granby	1	Milton	1	Stoughton	2
Athol	12	Granville	1	Monson	1	Sudbury	1
Attleboro	31	Greenfield	4	Natick	4	Swampscott	1
Auburn	1	Halifax	1	Needham	1	Swansea	1
Barnstable	6	Hanover	2	New Bedford	22	Taunton	40
Belmont	3	Hanson	1	Newburyport	4	Templeton	9
Beverly	1	Hardwick	1	Newton	4	Tisbury	2
Billerica	1	Haverhill	3	Norfolk	3	Upton	1
Blackstone	2	Hingham	4	North Adams	3	Uxbridge	2
Bolton	3	Holbrook	1	Northampton	4	Wakefield	1
Boston	99	Holliston	1	North Attleborough	20	Walpole	11
Boylston	1	Holyoke	11	Northborough	1	Waltham	4
Braintree	2	Hopedale	6	North Brookfield	1	Ware	2
Brewster	1	Hopkinton	1	Northfield	2	Wareham	2
Bridgewater	6	Hubbardston	1	North Reading	1	Watertown	3
Brimfield	1	Lakeville	1	Norton	4	Webster	2
Brockton	42	Lawrence	19	Norwood	10	Wellesley	2
Brookline	3	Lee	1	Oak Bluffs	1	Westborough	2
Cambridge	10	Leicester	1	Orange	2	West Brookfield	1
Canton	3	Lenox	1	Peabody	2	Westfield	6
Charlton	2	Leominster	2	Pembroke	3	Westminster	2
Chatham	1	Leverett	1	Pittsfield	7	Westport	3
Chelsea	3	Lexington	2	Plainville	7	West Springfield	9
Cheshire	1	Littleton	1	Plymouth	11	Westwood	3
Chicopee	10	Lowell	5	Plympton	2	Weymouth	4
Clinton	1	Ludlow	1	Quincy	2	Whitman	6
Danvers	1	Lynn	27	Reading	1	Wilbraham	2
Dartmouth	4	Malden	4	Revere	4	Williamstown	1
Dedham	13	Mansfield	18	Rochester	3	Winchendon	3
Dighton	2	Marblehead	2	Rockland	4	Winchester	1
East Bridgewater	2	Marion	1	Russell	1	Winthrop	1
East Longmeadow	1	Marlborough	6	Sandwich	1	Worcester	16
Easton	8	Marshfield	3	Saugus	1	Wrentham	6
Everett	2	Medfield	2	Scituate	1	Yarmouth	2
Fairhaven	1	Medford	9	Seekonk	1	State Institutions	45
Fall River	22	Medway	8	Sharon	2		
Falmouth	3	Melrose	1	Shelburne	1		
Fitchburg	4	Mendon	1	Shrewsbury	1		

Table 7.—*State of Disease of New Patients Admitted*

	Males	Females	Totals
Early	90	98	188
Moderately advanced	176	135	311
Advanced	112	138	250
Non-malignant	47	168	215
Totals	425	539	964

Table 8.—*Condition of Patients Discharged*

	Males	Females	Totals
Same	165	173	338
Improved	349	515	864
Totals	514	688	1,202

Table 9

This table includes all new cases treated, both house patients and out-patients. In some instances, the same patient has been counted twice or more times, according to the varying conditions presented.

	Males	Females	Totals
Carcinoma			
Buccal Cavity and Pharynx:			
Buccal cavity	10	1	11
Cheek	6	1	7
Floor of mouth	6	3	9
Lip	59	–	59
Palate	5	–	5
Pharynx	7	–	7
Tongue	15	2	17
Tonsil	10	–	10
	118	7	125
Digestive Tract and Peritoneum:			
Anus	–	1	1
Bile-duct	1	–	1
Cecum	3	1	4
Colon	3	3	6
Esophagus	13	2	15
Intestine	–	1	1
Liver	2	–	2
Pancreas	6	–	6
Rectum	36	16	52
Sigmoid	7	4	11
Stomach	19	11	30
	90	39	129
Respiratory System:			
Bronchus	13	–	13
Ethmoid	1	–	1
Larynx	16	1	17
Lung	6	–	6
Mediastinum	–	1	1
Nasopharynx	1	1	2
Pleura	–	1	1
	37	4	41
Female Genital Organs:			
Cervix	–	103	103
Ovary	–	15	15
Uterus	–	25	25
Vagina	–	1	1
Vulva	–	8	8
	–	152	152
Breast	3	138	141
Male Genito-urinary Organs:			
Bladder	25	–	25
Kidney	7	–	7
Penis	4	–	4
Prostate	28	–	28
Scrotum	1	–	1
Testicle	4	–	4
	69	–	69
Skin:			
Ear	22	3	25
Eyelid	7	2	9
Face	59	39	98
Nose	37	25	62
Scalp	2	5	7
Skin (other sites)	30	9	39
Temple	10	5	15
	167	88	255
Other or Unspecified Organs:			
Antrum	3	2	5
Bladder (female)	–	5	5
Branchiogenic carcinoma	3	–	3
Conjunctiva	1	–	1
Kidney (female)	–	2	2
Parotid	2	1	3
Rib	1	–	1
Sphenoid sinus	–	1	1
Submaxillary gland	1	–	1
Thyroid	4	–	4
Primary site unknown	5	1	6
	20	12	32
Lymphoblastoma and Hodgkin's Disease	13	8	21
Ewing's Tumor			
Ribs	1	–	1
Leukemia	2	6	8
Sarcoma:			
Scalp	–	1	1
Testicle	1	–	1
Adenofibrosarcoma (breast)	–	2	2
Angiosarcoma (stomach)	1	–	1
Chondrosarcoma (femur)	1	–	1
Fibrosarcoma:			
Abdomen	1	–	1
Breast	–	1	1
Femur	1	–	1
Groin	1	–	1
Ilium	1	–	1
Knee	1	–	1
Scalp	1	–	1
Shoulder	1	–	1
Supraclavicular area	1	–	1
Thigh	1	1	2
Upper arm	–	1	1
Leiomyosarcoma (uterus)	–	2	2
Leiomyosarcoma (uterus), clinically benign	–	3	3
Lipomyxosarcoma (thigh)	1	–	1
Myxosarcoma	1	–	1
Osteogenic sarcoma:			
Humerus	1	–	1
Knee	1	–	1
Reticulum-cell sarcoma	1	1	2
Spindle-cell sarcoma	–	1	1
	17	13	30
Myeloma	2	1	3
Amelanotic Malignant Melanoma	–	1	1
Malignant Melanoma:			
Back	1	–	1
Cheek	1	2	3
Chest wall	1	–	1
Ear	–	1	1
Eye	–	2	2
Finger	–	1	1
Heel	1	–	1
Neck	–	1	1
Vulva	–	1	1
	4	8	12
Mixed Tumor, Malignant:			
Antrum	1	–	1
Parotid	1	–	1
	2	–	2
Malignant Teratoma:			
Testicle	1	–	1

TABLE 9—*Continued*

	Males	Females	Totals
MALIGNANT TUMOR, TYPE UNKNOWN:			
Humerus	1	–	1
Spine	1	–	1
	2	–	2
NON-MALIGNANT TUMORS:			
Adenocystoma	1	–	1
Adenofibroma	1	7	8
Adenoma	2	3	5
Chondroma	2	–	2
Cyst	5	3	8
Cystadenoma	–	3	3
Endometrioma	–	1	1
Fibroma	4	5	9
Hemangioma	3	7	10
Hematoma	–	2	2
Leiomyoma	2	38	40
Lipoma	3	10	13
Lymphangioma	1	2	3
Medulloblastoma	1	–	1
Mixed tumor (benign)	1	1	2
Neurilemoma	–	1	1
Neurofibroma	3	–	3
Osteoma	2	–	2
Papilloma	15	12	27
Polyp	9	45	54
Tumor, nature unspecified	1	6	7
	56	146	202
RHEUMATIC AND NUTRITIONAL DISEASES:			
General diseases	8	36	44
Diabetes mellitus	3	10	13
Diseases of thyroid	3	13	16
	14	59	73
DISEASES OF BLOOD AND BLOOD-MAKING ORGANS	2	5	7
DISEASES OF NERVOUS SYSTEM AND ORGANS OF SPECIAL SENSE:			
Nervous system	8	21	29
Organs of vision	5	–	5
Ear and mastoid	2	3	5
	15	24	39
DISEASES OF CIRCULATORY SYSTEM:			
Circulatory system (general)	102	98	200
Lymphatic system	1	4	5
	103	102	205
DISEASES OF RESPIRATORY SYSTEM:			
Respiratory system (general)	51	17	68
Nasal fossae and annexae	4	4	8
Larynx	3	–	3
	58	21	79
DISEASES OF DIGESTIVE SYSTEM:			
Buccal cavity and annexae, pharynx and tonsils	56	20	76
Esophagus	1	3	4
Gall bladder and biliary passages	10	34	44
Intestines	36	64	100
Liver	3	5	8
Pancreas	–	1	1
Peritoneum	2	4	6
Stomach	8	2	10
Ulcer of stomach and duodenum	38	8	46
	154	141	295
DISEASES OF GENITO-URINARY SYSTEM:			
Bladder	8	25	33
Kidneys and ureters	23	27	50
Prostate	46	–	46
Urethra, urinary abscess, etc.	1	5	6
Male genital organs	3	–	3
Female genital organs	–	242	242
Cysts of ovary	–	16	16
Breast	–	43	43
	81	358	439
DISEASES OF SKIN AND CELLULAR TISSUE:			
Keloid	1	1	2
Keratosis	78	55	133
Hyperkeratosis	7	4	11
Arsenical keratosis	1	–	1
Sebaceous cyst	7	5	12
Verruca	7	4	11
Other diseases	22	29	51
	123	98	221
CONGENITAL MALFORMATIONS:			
General diseases	1	5	6
Nevus	3	16	19
	4	21	25
INFECTIOUS AND PARASITIC DISEASES:			
General diseases	4	14	18
Erysipelas	2	–	2
Syphilis	14	16	30
Tuberculosis	17	12	29
	37	42	79
OTHER CONDITIONS	19	15	34
NO DISEASE	7	19	26
NO DIAGNOSIS	20	32	52

Financial Report, Pondville Hospital at Norfolk, 1936

To the Department of Public Health:

I respectfully submit the following report of the finances of this institution for the fiscal year ending November 30, 1936:

STATEMENT OF EARNINGS

Board of patients:		
Private	$29,189 59	
Cities and towns	49,142 27	
Out-patient department	1,080 00	
Accident cases	24 50	
		$79,436 36
Personal services:		
Reimbursement from Board of Retirement		$86 00

Sales:			
Travel, transportation and office expenses	$3 50		
Food	278 40		
Furnishings and household supplies	129 98		
Medical and general care	143 68		
Heat, light and power	1 00		
Garage, stable and grounds	4 41		
Repairs, ordinary	25		
Miscellaneous—junk	38 12		
Board of special nurses	101 00		
Total sales		$700 34	
Miscellaneous:			
Rents, board and room	$51 00		
Total, miscellaneous		$51 00	
Total earnings for the year			$80,273 70
Total cash receipts reverting and transferred to the State Treasurer			$86,747 55
Accounts receivable outstanding Dec. 1, 1935		$56,773 49	
Accounts receivable outstanding Nov. 30, 1936		50,299 64	
Accounts receivable increased			$6,473 85

Maintenance Appropriation

Balance from previous year, brought forward		$2,735 84
Appropriation, current year	$352,440 00	
		352,440 00
Total		$355,175 84
Expenditures as follows:		
Personal services	$189,052 65	
Food	48,912 73	
Medical and general care	25,238 57	
Farm	—	
Heat, light and power	17,342 67	
Garage, stable and grounds	2,773 35	
Travel, transportation and office expenses	10,968 79	
Religious instruction	1,200 00	
Clothing and materials	696 78	
Furnishings and household supplies	17,312 88	
Repairs, ordinary	2,332 28	
Repairs and renewals	11,287 44	
Radium	5,305 66	
Total maintenance expenditures		$332,423 80
Balance of maintenance appropriation, Nov. 30, 1936		$22,752 04
Estimated outstanding liabilities, Nov. 30, 1936		$3,917 85

Special Appropriations

Balance December, 1, 1935, brought forward		$100,816 27
Appropriations for current year		4,000 00
Total		$104,816 27
Expended during the year (see statement below)	$92,317 14	
Reverting to Treasury of Commonwealth	232 70	
		92,549 84
Balance November 30, 1936, carried to next year		$12,266 43

Appropriation	Act or Resolve	Total Amount Appropriated	Expended during Fiscal Year	Total Expended to Date	Balance at End of Year
Massachusetts State Project H-6 P.W.A. Docket 4200	1934	$95,425 00	$16,569 40	$93,351 97	$2,073 03
Massachusetts State Project H-5 P.W.A. Docket 4476	1934	221,400 00	38,808 98	212,437 46	8,962 54
Installation of Incinerator	1935	2,000 00	325 51	1,892 54	107 46
Moving and Improving Bacteriological Laboratory	1935	2,000 00	1,990 94	1,990 94	9 06
Engine and Generator Reconditioning and Installing	1935	2,500 00	2,378 20	2,448 70	51 30
Service Building, Renovations, etc.	1936	12,500 00	11,670 53	11,670 53	829 47
Additional Water Supply and Sprinklers	1935	3,000 00	1,489 60	2,883 82	116 18
Generation of Power Improvements	1935	18,500 00	17,885 68	18,451 61	48 39
Improvements—Water Supply System	1936	500 00	262 88	262 88	237 12
Improvements—Sewage Disposal	1936	1,000 00	935 42	935 42	64 58
Totals	—	$358,825 00	$92,317 14	$346,325 87	$12,499 13

Per Capita

During the year the average number of patients has been		128.22
Total cost of maintenance	$332,423 80	
Equal to a weekly per capita cost of (52 weeks to year)	49 87	
Total receipts for the year	86,747 55	
Equal to a weekly per capita of	13 02	
Total net cost of maintenance for year (total maintenance less total receipts)		$245,676 25
Net weekly per capita	36 85	

Respectfully submitted,

Marion MacKenzie,
Treasurer.

Inventory, Pondville Hospital at Norfolk

GRAND SUMMARY SHEET

November 30, 1936

Real Estate

Land, 324.2 acres	$12,357 00	
Buildings	770,675 24	
Betterments (additions and improvements)	9,287 50	
Total, Real Estate		$792,319 74

Personal Property Undistributed Supplies

Travel, transportation and office expenses	$1,221 31	
Food	3,597 44	
Clothing and materials	3,202 17	
Furnishings and household supplies	11,245 62	
Medical and general care	24,582 06	
Heat, light and power	4,242 95	
Garage, stable and grounds	79 24	
Repairs	9,492 84	
		$57,663 63

Personal Property Distributed Supplies

Travel, transportation and office expenses	$6,843 65	
Clothing and materials	955 33	
Furnishings and household supplies	77,025 76	
Medical and general care	57,191 85	
Garage, stable and grounds	8,016 64	
Repairs	4,897 63	
Total	$154,930 86	
Less 5% depreciation	7,746 54	
		$147,184 32

Grand Summary

Real Estate—Total	$792,319 74	
Personal Property—Undistributed Supplies, Total	57,663 63	
Personal Property—Distributed Supplies, Total	147,184 32	
Radium in Emanation Plant	69,880 30	
Total		$1,067,047 99

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Leon C. Bradley

Public Document No. 34

The Commonwealth of Massachusetts

ANNUAL REPORT

OF THE

Department of Public Health

FOR THE

YEAR ENDING NOVEMBER 30, 1937

PUBLICATION OF THIS DOCUMENT APPROVED BY THE COMMISSION ON ADMINISTRATION AND FINANCE
1500. 5-'38. Order 3992.

BACT. & PHYS.

The Commonwealth of Massachusetts

Department of Public Health
State House, Boston, January 19, 1938.

To the Honorable Senate and House of Representatives:

In accordance with the provisions of Section 32 of Chapter 30, General Laws, I have the honor to submit herewith the annual report of the Department of Public Health for the year ended November 30, 1937.

Respectfully submitted,

Henry D. Chadwick, M.D.,
Commissioner of Public Health.

TWENTY-THIRD ANNUAL REPORT

OF THE

DEPARTMENT OF PUBLIC HEALTH OF MASSACHUSETTS

REPORT OF THE PUBLIC HEALTH COUNCIL

At the end of the fiscal year closing November 30, 1937, the Department of Public Health was constituted as follows:

Commissioner of Public Health . . . . Henry D. Chadwick, M.D.

Public Health Council

George D. Dalton, M.D., 1940
Francis H. Lally, M.D., 1939
Charles F. Lynch, M.D., 1940
Richard M. Smith, M.D., 1939
Richard P. Strong, M.D., 1938
James L. Tighe, B.A.Sc., C.E., 1938

Regular monthly meetings of the Department have been held throughout the year. An additional meeting was held in May in order to hold a hearing upon the application of the Salem-Beverly Water Supply Board for approval of the taking of certain land for the protection of the water supply of those two communities. Immediately following the regular meeting of the Council in January, a joint meeting with the Metropolitan District Water Supply Commission was held to consider certain matters in connection with the investigation relative to the Metropolitan water supply as directed by Chapter 48 of the Resolves of 1936. In connection with the September meeting a field trip was made to Hardy Pond, Waltham, the Neponset River in Norwood, and Musquashiat Pond, Scituate, to observe the progress of investigations being made under certain legislative resolves of the current year.

The Committee on Sanitary Engineering has met each month prior to the regular meeting of the Council and submitted its recommendations on all matters of sanitary significance.

Investigations on the following matters have been made as directed by legislative resolves of 1937: Chapter 13, providing for an investigation, in cooperation with the Department of Public Works, relative to the improvement of Musquashiat Pond in Scituate; Chapter 21, relating to an investigation relative to dredging and deepening of the Neponset River in Norwood; Chapter 28, relative to an investigation of the means of remedying pollution of Hardy Pond in Waltham; Chapter 35, relating to an investigation of the need of the establishment and maintenance in the County of Essex or Middlesex of an institution for the care and treatment of persons suffering from cancer; Chapter 46, providing for an investigation of occupational diseases, in cooperation with the Department of

MAY 28 1938

Labor and Industries; Chapter 42, providing for an investigation by the Metropolitan District Commission and this Department relative to additional sewers in the Metropolitan Sewerage Districts; Chapter 66, authorizing the Department to continue in cooperation with the Federal Works Progress Administration the investigation of certain rivers previously carried on under Chapter 49 of the Resolves of 1936; and Chapter 48, Resolves of 1936, providing for an investigation by the Metropolitan District Water Supply Commission and the Department of Public Health relative to improving the distribution and more adequately preventing pollution of the Metropolitan water supply. Reports of these investigations are ready for submission to the Legislature and are referred to in other parts of this report.

The Council has also carried out its regular duties as imposed by law, including the approval of regulations relative to foods and drugs, to cross connections between public water supplies and fire and industrial water supplies, to the treatment of persons exposed to rabies, to the treatment of persons suffering from gonorrhea or syphilis who are unable to pay for private medical care, and to the payment for certain laboratory tests on specimens from cases of pneumonia; approval of out-of-state shellfish dealers who have been approved by their respective state shellfish authorities and the U. S. Public Health Service; approval of appointments at state and county tuberculosis sanatoria; the granting of licenses for the conduct of dispensaries; approval of contracts for the care of tuberculous patients from the Hampden County Tuberculosis Hospital District at the Westfield State Sanatorium, for the care of tuberculous patients from Berkshire, Franklin and Hampshire counties at the Hampshire County Sanatorium, for the care of tuberculous patients from Nantucket and Dukes counties at the Barnstable County Sanatorium, for the care at the Massachusetts General Hospital of persons suffering from chronic rheumatism, and for the purchase of arsenicals; approval of certain hospitals as Cooperating Clinics for the treatment of persons suffering from gonorrhea or syphilis; and approval of subsidy to various cancer and gonorrhea and syphilis clinics. Seven public hearings were held as provided by statute relative to approval of the taking of certain lands for the protection of water supplies, the revocation of a permit for the bottling of carbonated non-alcoholic beverages, and an appeal from the action of a local milk inspector in refusing to grant a license to a certain dealer.

At a meeting of the Department on January 18, 1938, the Commissioner of Public Health presented to the Council a report of the doings of the Department for the year 1937, and after discussion it was voted that this report, together with the foregoing brief summary of the activities of the Public Health Council, be approved and adopted as the report of the Department of Public Health for the year 1937.

TWENTY-THIRD ANNUAL REPORT OF THE COMMISSIONER OF PUBLIC HEALTH

To the Public Health Council:

Gentlemen: I have the honor to submit herewith my annual report for the fiscal year ending November 30, 1937, although, as in the past, all figures except those relating to the budget will be given for the calendar year.

I. General Matters

The General Court passed ten resolves requiring special investigations in which this Department was made a participant. This necessitated a large amount of additional work, the greater part of which devolved upon the Division of Sanitary Engineering.

The Department, however, was relieved of the responsibility of the administration of the Minimum Wage Commission on May 29, 1937, by a legislative act which restored this Commission to the Department of Labor and Industries where it logically belonged.

The Special Commission appointed in 1935 to study and investigate public health laws and policies submitted its report to the General Court in December,

1936, and it was printed as House Document No. 1200. More than one hundred and fifty persons were appointed by the Commission as members of subcommittees that were assigned to different subjects pertaining to the public health. They gave much time and thought to gathering and digesting the material pertaining to the subject, upon which the final report was based. All phases of public health activities were studied and many changes in legislation were recommended. Altogether, fifty-eight bills were presented for consideration. Some of these were for the purpose of simplifying or clarifying the meaning of existing statutes, or were amendments to remove sections that had become obsolete. Others proposed entirely new legislation of public health significance. The committees to which these bills were referred gave them as careful consideration as was possible in the limited time available. It is with much gratification that I can report that fourteen of these recommendations were enacted into law. Others were referred to the next annual session to be taken up again or reintroduced in an amended form.

Three of the laws place upon the Department new and important responsibilities. Chapter 332 is an act providing for the care of certain infants prematurely born. Under this law, boards of health are required, upon request of the physician or parent of the premature infant, to provide transportation to a hospital equipped to care for such infants, and if the parents are unable to pay for such hospital care, it becomes the responsibility of the board of public welfare. This Department, through the Division of Child Hygiene, has been actively cooperating with the maternity hospitals throughout the State to see that they have proper equipment and trained nursing personnel for the care of premature infants.

Chapter 393 is an act for the hospitalization of patients with chronic rheumatism. The purpose of this legislation is to enable patients with chronic rheumatism, not to exceed twenty-five in number, to be given hospital care at the expense of the State, so that their disease may be carefully studied for the purpose of determining the cause and to develop a satisfactory method of treatment that will be beneficial not only to the patients under care but to others who have the same type of disease. The term "chronic rheumatism" comprises a group of diseases the most evident symptoms of which usually appear in the joints. Such joint manifestations are spoken of as arthritis, the common forms of which are commonly called chronic rheumatic disease. The forms of arthritis of known origin present problems which are easier to solve. The forms of arthritis of unknown origin comprise a much larger group, result in more crippling, and present the most difficult problems encountered in chronic rheumatic disease. This group of diseases is of great social and economic importance. It is estimated that over 5,000 persons in the State are totally disabled and about 140,000 are crippled to a varying degree. The incidence among the poor is about 50 per cent higher than among the well-to-do. A contract has been made with the Massachusetts General Hospital for the care of twenty patients with joint disease, selected as representing certain types of crippling conditions. The Department has designated Dr. Walter Bauer as director, with an advisory committee to carry out the study, which is expected to continue for several years.

Chapter 391 went into effect August 28, 1937, and transfers to the Commonwealth the responsibility for the treatment of persons having gonorrhea or syphilis who are unable to pay for private medical care. The taking over of this vast amount of work on a state-wide basis made it necessary to set up a new Division within the Department. Accordingly, the Subdivision of Gonorrhea and Syphilis, hitherto a part of the Division of Communicable Diseases, was given equal rank with the other Divisions, and Dr. Nels A. Nelson was promoted from Assistant Director to Director, with enough added personnel to carry on the work. Instead of setting up new clinics and operating them as Departmental agencies, it was decided to make use of existing clinics, organize such new ones as might be needed, and pay for the treatment given on a fee basis. With the aid of the State Comptroller and State Auditor, a bookkeeping system was set up by which each treatment given in any of these clinics is reported to the Department. A fee of 75 cents per treatment was agreed upon as a basic amount, with the provision that adjustment would be made at the end of the year if the expense of maintaining a clinic on the standard set up by the Department exceeded the amount received from fees. It is estimated that the cost of treatment of gonorrhea and syphilis through

this plan will be approximately $200,000 per year. This, however, does not mean that an additional burden will be levied on the taxpayer, as under previous legislation the financial responsibility for such treatment has been placed upon the local boards of health. In other words, what has been the financial responsibility of the local boards of health now becomes the responsibility of the Commonwealth. The treatment of gonorrhea and syphilis should be more effectively done, as the clinics will be maintained at a higher standard and an effective follow-up system has been put into practice. Furthermore, when a patient lives too far to make it feasible for him to attend one of the clinics, arrangements may be made to pay a local physician to give the treatment.

Departmental Changes.—In addition to the new Division of Genitoinfectious Diseases referred to above, it has been necessary to make other changes as a result of the resignation of Dr. Gaylord W. Anderson, who had been Deputy Commissioner and Director of the Division of Communicable Diseases since May, 1931, to take the position of Professor of Preventive Medicine at the University of Minnesota. To fill the vacancy, on September 1, 1937, Dr. Alton S. Pope, Director of the Division of Sanatoria and Tuberculosis, was appointed Deputy Commissioner, and Dr. Roy F. Feemster, Assistant Director of the Division of Biologic Laboratories, was made Director of the Division of Communicable Diseases.

Federal Grants from the United States Public Health Service and Children's Bureau.—For the second year we have had Federal funds allotted to this Department for public health work. These funds are paid to the State Treasurer in quarterly installments to be expended through the Department of Public Health. We submit a budget to the Public Health Service and to the Children's Bureau for approval. When funds are received, they are disbursed under the same regulations as are State funds appropriated to this Department. There is no interference by Federal authorities over the details of administration. These grants are outright gifts to the states, and the Federal Government does not expect to be reimbursed in any way for the funds so allotted. The total amount received is equal to approximately one half of the State appropriation to this Department. The allotments for the Federal fiscal year from July 1, 1937, to June 30, 1938, are as follows:

TREASURY DEPARTMENT, UNITED STATES PUBLIC HEALTH SERVICE	
Division of Administration	$32,969.00
Division of Adult Hygiene	9,330.00
Antitoxin and Vaccine Laboratory	16,560.00
Division of Communicable Diseases	11,600.00
Division of Food and Drugs	12,220.00
Division of Genitoinfectious Diseases (special project)	29,500.00
(general)	4,162.16
Division of Sanitary Engineering	28,000.00
Division of Tuberculosis	6,260.00
Wassermann Laboratory	7,470.00
Training personnel	21,000.00
N. E. Training Center for Control of Syphilis and Gonorrhea	12,000.00
Harvard School of Public Health	7,500.00
Barnstable County District	2,580.00
Berkshire County District	16,733.75
Franklin County District	9,675.00
Nashoba District	8,911.09
Total	$236,471.00
DEPARTMENT OF LABOR, CHILDREN'S BUREAU	
Services for crippled children	$84,678.48
(Polio outbreak; money available, 10 mo.)	8,362.97
Maternal and child hygiene—Fund A	72,365.37
Maternal and child hygiene—Fund B	10,350.00
Total	$175,756.82

SUMMARY

U. S. Public Health Service	$236,471.00
Children's Bureau—maternal and child hygiene	82,715.37
Children's Bureau—crippled children	84,678.48
	$403,864.85
Additional for polio outbreak; 10 mo.	8,362.97
Total (1938 allotment)	$412,227.82
1937 balance made available (Children's Bureau)	16,315.07
Grand total	$428,542.89

This makes a substantial increase in the funds available and has enabled us to broaden our work in maternal and child hygiene and provide services for crippled children. For this latter project we have established monthly clinics in each of the following ten cities: Brockton, Fall River, Gardner, Haverhill, Hyannis, Lowell, Pittsfield, Salem, Springfield, and Worcester. An orthopedic consultant is in charge of each clinic, who determines what treatment the children need, and, if surgery is indicated, the operations are done in a nearby hospital and all expenses are paid out of these funds.

During the year 1,405 clinic visits were made by 678 children. One hundred eighty-six patients have been admitted to hospitals, and they have received 7,584 days of hospital care. A total of 138 operations have been performed. In addition, 11 were admitted to hospitals for study, and 13 were admitted for application of casts or apparatus. A large number of physiotherapy treatments were given either in the patient's own home or some central place where several patients gathered by appointment.

Milk.—The past year has again been characterized by the fact that no outbreaks of milk-borne typhoid, scarlet fever, or septic sore throat have occurred. On the other hand, the number of cases of undulant fever discovered continues at a high level.

During the year the number of communities requiring pasteurization or certification of all milk sold locally has increased from 32 to 37. This regulation has become effective during the year in Greenfield, Haverhill, Pittsfield, Springfield and Worcester. These 37 communities have a combined population of 2,787,559, which represents 64 per cent of the population of the State. In addition, 4 other communities, Chicopee, Fitchburg, Medford and Needham, have passed regulations which will take effect during 1938. As the year ends, Hudson and Lincoln are seriously considering passing the same regulation, and a number of additional communities are making plans to pass such a regulation as soon as public opinion can be developed to back up the enforcement.

The reasonableness of the regulation passed by the Board of Health of Pittsfield has been confirmed by a decision of the Superior Court. Several communities that were deferring action until after this case came to trial have begun putting their regulations into effect.

District Health Units.—There has been no increase in the size of the Berkshire County Health District, which has a membership of 15 towns. Demonstration work has been carried on in some of the adjoining towns with the hope and expectation that they would vote to join the district.

The Nashoba Associated Boards of Health continues to function with a membership of 10 towns. There is some sentiment in two of the nearby towns toward joining the district in the near future. During the year a substantially built and well-furnished building has been given to the district by the Commonwealth Fund of New York. This affords a very adequate centre for the activities of the unit and a meeting place for a number of important organizations that carry on their work in this area.

The Barnstable County Health District has improved its facilities by the installation of a well-equipped milk laboratory and has added another nurse to its staff.

The Franklin County Health District now has a membership of 16 towns, with

a population of 14,105. The population is too small to carry any large part of the expenditure necessary for satisfactory health service. Continued efforts are being made to interest the other towns in the county in the services of the unit.

Interest is growing in Hampshire County in the establishment of a county unit, and it is hoped that during the next few months something definite may be developed.

Board of Health Records.—The program of improving local board of health records was continued during the past year. Visits by the Department staff were made to 17 cities and towns in addition to the health districts.

The fact that more and more communities are beginning to request this assistance is good evidence that they appreciate its value.

Clinics and Dispensaries.—The licensing of clinics and dispensaries has continued on the same basis as in previous years.

It would be desirable to require more stringent regulations than those that have been in force in the past. It is hoped that the average of clinic service may be brought up to a higher standard. This is a matter which will receive consideration during the coming year.

II. Communicable Disease

The past year has been characterized by the lowest case rate and the lowest death rate for diphtheria in the history of the State. On the other hand, paratyphoid fever and whooping cough have been more prevalent than in any previous year. The total number of cases of communicable disease reported during the year was 97,766, as compared to 106,110 for 1936, most of the difference being due to a lower incidence of measles and mumps.

Prevalence of Certain Diseases

Anterior Poliomyelitis (Infantile Paralysis).—The occurrence of 352 cases and 21 deaths brought the incidence of this disease back to slightly higher than normal levels after a record low year in 1936. The disease began early in the season with a focus in Newburyport, after which cases increased quite rapidly in the Merrimack Valley, the North Shore, and the Northern Metropolitan Area. After September 1 the incidence of the disease decreased, but new cases began to be reported from practically every section of the State, so that by the end of the season the cases were much more evenly distributed than at any time in recent years. Out of 352 cases, 107 were reported to be nonparalytic.

This year for the first time we attempted to obtain the name of the physician caring for each patient so that we could offer the services of an orthopedic consultant through the crippled children clinics. It is important that children paralyzed from poliomyelitis have the advice of an orthopedic surgeon as soon as possible to prevent contractures and so limit the crippling handicaps that would otherwise result from paralysis.

It is noteworthy that the use of convalescent serum has been practically abandoned by the physicians, as only 11 doses were reported to have been used during the season. Because of the quite general opinion that the use of convalescent serum is of no value, the collection and processing of blood obtained from convalescents has been given up, and as soon as the stock on hand is disposed of, its distribution will be discontinued.

The practice of sending out a consultant on the request of a physician in cases where no paralysis has become evident has been continued. This service has been requested by physicians in 40 cases.

Diphtheria.—The remarkable downward trend in diphtheria incidence has been continued during the year. This year we have had only 170 cases reported, while in 1936 there were 307 cases, which was a new record up to that time. The deaths have dropped from 27 in 1936 to 14 this year. Adequate immunization programs in Lowell and Chicopee are responsible for a portion of the decrease in cases. A well-organized immunization program was carried out in Quincy, and most of the other larger communities continued their programs with increasing emphasis upon the pre-school groups. The continued development of interest in immunizing the younger children is undoubtedly beginning to bear fruit, but it is only by keeping

up interest in immunization programs that we will be able to hold diphtheria at its present low level.

During the year the Department has discontinued the distribution of toxin antitoxin for use in clinics in school and pre-school groups. Distribution will be continued for use in immunizing adults and older children since toxoid appears to give more reaction in this group than does toxin antitoxin.

Dysentery, Bacillary.—The year has been characterized by an increasing number of small outbreaks of bacillary dysentery. The disease has continued endemic in the Belchertown State School and in the Fernald School. No large outbreak of cases has occurred within these schools but the constant presence of the disease has made it necessary to be continually on the alert for fear such an outbreak might occur.

Small outbreaks have occurred in the pediatric wards of several hospitals in the State, and, fortunately, have not resulted in any deaths.

Gastro-Enteritis.—The usual number of outbreaks of gastro-enteritis, apparently due to etiological agents other than the usual intestinal pathogens, have occurred during the year. Several of these have occurred in private schools and colleges.

During the month of August gastro-enteritis was reported from many parts of the eastern portion of the State, and investigation disclosed that many of these individuals became ill shortly after consuming lobster meat or crab meat, usually in the form of salads or sandwiches. Inspection of the plants of dealers disclosed sanitary conditions which appeared to be not entirely satisfactory. Examination of specimens from persons affected and examination of samples of meat failed to yield any of the usual intestinal organisms responsible for conditions of this kind.

An outbreak of diarrhea occurred among the infants in the maternity ward in one of the general hospitals, and four deaths resulted before it was brought under control.

The continued occurrence of outbreaks of this kind constitutes a problem in which the health officer will be at a disadvantage until further study reveals the cause of such illnesses. If some of them are due to viruses spread through the respiratory tract, it is hoped that the recent increasing interest in virus diseases may lead someone to undertake a study of these conditions. The constant presence of bacilli dysentery and the recent invasion of the paratyphoid bacillus demand that the health officer be constantly on the alert to demonstrate that the outbreaks which occur are not due to these intestinal pathogens.

Influenza.—The State has been remarkably free from this disease during the past year.

Malaria.—Sixteen cases were reported, most of which were unquestionably infected outside of Massachusetts.

Measles.—Following an extremely low incidence in 1935, measles became very prevalent late in the season of 1936, and this increase was carried over into the early part of 1937. The trend has been downward in the last few months and has again dropped to a low level. The low fatality rate has continued and only 33 deaths occurred during the year.

Meningococcus Meningitis.—This disease has been at a slightly lower level than during the previous year. One hundred seventy-one cases were reported, as compared to 191 for last year. The number of deaths reported was 78, which is 22 less than the previous year.

Small foci occurred in two State institutions. At the State Infirmary there were two cases and one death, and at the Metropolitan State Hospital, four fatal cases.

Paratyphoid Fever.—This disease, which for many years has been at a very low level, has assumed considerable importance during 1937. Two hundred seventy-six cases have been reported, as compared to 7 a year ago. Most of these cases were discovered in the investigation of three well-defined outbreaks. The first of these occurred in the North Metropolitan and Merrimack River areas as the result of the eating of cream-filled bakery products manufactured and distributed to many nearby towns by a Lowell dealer. Examination of the food handlers in the bakery disclosed the fact that one employee was carrying paratyphoid B bacilli in his intestinal tract, but it was impossible to decide whether he was the carrier responsible for infecting the pastry or whether he himself had become

infected through eating the infected product. A total of 132 cases was discovered on investigation of this outbreak.

The second outbreak was one which occurred in Simmons College at the close of the school year. A difficult problem arose due to the fact that a large number of the girls who had been exposed to the infection were leaving to take positions as waitresses and food handlers in other capacities in many summer hotels. It therefore became necessary to send notices to all of the students of the school, as well as to the health departments of the states to which they were going, to make sure that those who had become infected and were carrying paratyphoid bacilli should not engage in food handling capacities until bacteriological tests proved they were free from paratyphoid B bacilli.

Investigation pointed to the fact that the outbreak was due to the consumption of chicken salad and to chicken salad sandwiches served on the following day. In many instances the illness was so slight that a physician would not have been consulted had not the exposure been called to the attention of the students. Some of those who had no symptoms at all were found to be carrying paratyphoid bacilli. One of the employees of the cafeteria, who probably had a part in preparing the chicken salad, denied having had any symptoms suggestive of paratyphoid fever and her Widal test was consistently negative; yet stool specimens were positive for paratyphoid B bacilli and have remained consistently positive to the present date. Whether or not she was the cause of the outbreak or a victim of it will never be known.

The third outbreak was one which occurred among those who ate at one or the other of two buffet meals served in a private school. This outbreak likewise occurred as the school was breaking up and it was impossible to follow all the students to discover whether or not they became ill. Notices were sent to all boards of health and state health departments in the areas from which these students came, but since none of them were known to be planning to engage in a food handling capacity during the summer, there was little danger of spread of the infection. Fifteen individuals were found by laboratory examination to be ill of this infection, and 12 were found to have symptoms with no laboratory confirmation.

Following these outbreaks, additional cases have occurred in various parts of the State, and may possibly be due to individuals who became infected through one or the other of the outbreaks. A small outbreak occurred at a christening in Easthampton, attended by about 25 individuals. Four cases were discovered among Massachusetts residents and four among ten individuals who attended the party from Connecticut.

Several individuals who were infected during these outbreaks continue to carry paratyphoid organisms in their intestines to the present time.

Pneumonia, Lobar.—The high incidence of lobar pneumonia noted last year continued through 1937, with 5,300 cases being reported. The deaths have continued at a similar high level, 1,940 being recorded, as compared to 1,944 for 1936.

This is the second year that the pneumonia program has been completely carried at State expense. The fact that other states have begun to give considerable publicity to the initiation of pneumonia programs has stimulated greater interest in Massachusetts. The continued reference to the pioneer work of this State in such publicity has assisted in focusing attention upon our program.

More and more physicians are making use of the serum. During the year, physicians who have reported deaths from pneumonia and whose names were not found on the list of those who had requested serum, were circularized and given an opportunity to ask that a member of our staff call upon them to explain the pneumonia program. A number of replies have come in from these physicians.

Serum for treating Type V cases became available in our laboratory late in the spring, and several cases were treated immediately upon its release with excellent results. No serum for the treatment of cases due to Types VII and VIII was available during the calendar year, but a supply will be released early in 1938. Before the end of the present pneumonia season, a change will be made in the method of distribution so that only monovalent Type I serum will be available at the eighty approved typing stations throughout the State. Bivalent Type II and Type V serum and bivalent Type VII and Type VIII serum will be available

at all times through about fifteen typing laboratories chosen because of their geographical distribution. In addition to these fifteen laboratories, these two serums will also be made available whenever the supply is sufficient, through certain other of the more active typing laboratories.

Doctor Roderick Heffron, who was director of the pneumonia program for the five-year period which ended in 1935, continued to assist us until he left in September to take a position with the Commonwealth Fund. Dr. F. R. Philbrook has been added to the staff to assist in carrying on the program. He will coordinate the work of the typing laboratories and spend much time in the field informing physicians in regard to the pneumonia program.

We are now able to pay a small fee to approved laboratories for doing sputum typing and blood cultures for patients who are not hospitalized and who are unable to pay a private laboratory for doing this work.

Rabies.—Another year has passed without a case of rabies in humans, although the disease in animals again showed an increase. Two hundred and ten rabid animals were discovered in the State during 1937. The foci in the North Metropolitan Area and in the upper Merrimack Valley continued very active throughout the year. The focus in the City of Worcester disappeared but an increase in rabies throughout Worcester County has been noted. The focus in Templeton which began late last year continued throughout the early months of 1937, cases spreading both ways along the Mohawk Trail.

We have continued to encourage the immunization of dogs as the only method which gives promise of aid in controlling this disease. During the past year, dog immunization clinics were conducted in 44 communities.

Scarlet Fever.—Scarlet fever has continued at the low incidence recorded for the past three years. Eight thousand two hundred ninety cases were reported, as compared to 8,774 a year ago. The death rate has again declined, with only 42 deaths recorded, as compared to 44 in 1936.

Studies of scarlet fever immunization by use of a formalinized toxin have continued during the year. This makes the fourth year that community programs have been carried on. Immunization programs in a number of institutions have been continued, and nurses in several hospitals have been inoculated with our formalinized toxin.

At the October meeting of the American Public Health Association, Dr. Gaylord W. Anderson read a preliminary report on results of the work so far. He was very conservative in his claims, stating frankly that we had not been able to render as high a per cent of the children inoculated Dick negative as we had desired, but his figures indicated that a worth-while result had been achieved in reducing the incidence of scarlet fever among those who had received injections.

Septic Sore Throat.—One hundred ninety-seven cases of this disease were reported, about 40 less than in 1936. These were sporadic infections acquired through contact, and there was no evidence at any time to suspect that milk might have been responsible for the spread of the disease.

Smallpox.—The fifth consecutive year has passed without a single case of smallpox being reported in Massachusetts. This very satisfactory record is undoubtedly due to the law which makes compulsory the vaccination of all children attending the public schools and to the fact that so many of the private schools require vaccination. As a result of this, the immunity of the population of Massachusetts is kept at a very high level.

Tuberculosis.—For the first time a ratio of over two new cases of pulmonary tuberculosis was reported for each annual death. This is probably due to more effective case-finding and not to an increase in the incidence of tuberculosis. It is gratifying to report that the death rates for both pulmonary and extrapulmonary forms continued to decline to a new total of approximately 40 per 100,000. In the face of a stationary rate for the country as a whole in 1936 and an actual increase in some twenty-four states the situation in Massachusetts is gratifying. The following table shows that there has been a decrease during the ten-year period, from a death rate of 74.2 to approximately 40, which is an average decrease of over three points per year:

TUBERCULOSIS DEATHS AND DEATH RATES PER 100,000
MASSACHUSETTS 1928–1937

Year	Pulmonary Deaths	Pulmonary Rate	Other Forms Deaths	Other Forms Rate	Total Deaths	Total Rate
1928	2,690	63.9	433	10.3	3,123	74.2
1929	2,561	60.5	361	8.5	2,922	69.1
1930	2,423	56.9	311	7.3	2,734	64.3
1931	2,306	53.9	248	5.8	2,554	59.7
1932	2,041	47.5	261	6.1	2,302	53.5
1933	2,058	47.7	222	5.1	2,280	52.8
1934	1,902	43.8	214	4.9	2,116	48.7
1935	1,814	41.6	147	3.4	1,961	45.0
1936	1,726	39.4	164	3.7	1,890	43.1
1937	1,759	39.9	125	2.8	1,884	42.7

State Sanatoria.—There has been a slight decrease in the number of patients treated and in the total number of patient days of treatment, due almost entirely to the diminishing need for hospital care of children with childhood type of the disease. This has been particularly noticeable at the Westfield State Sanatorium. Formerly the average number of patients was approximately 300. During the last three years the number has steadily dropped, until it is now below 150, and this fall it was possible to close three of the children's wards. This is the most outstanding evidence of the value of the tuberculosis control program that has been carried on in the State for the past forty years. The objectives of this program have been provision of sufficient beds to care for all cases of tuberculosis as soon as they were found and the development of more effective tuberculosis case-finding for both children and adults.

In this program the State sanatoria have served as diagnostic centers and have been used to a greater and greater extent by physicians. During the past year, 7,832 diagnostic examinations were made for physicians or boards of health in the out-patient departments and consultation clinics of the four State sanatoria. This was an increase of 17.5 per cent over the previous year.

Tuberculosis and Cancer Hospital Building at Westfield.—On November 29 the first patients were admitted to the new Cancer-Tuberculosis Unit of the Westfield State Sanatorium. This fireproof modern type of hospital building, the first of its type in the country, provides 50 beds for the treatment of cancer and 144 for tuberculosis. Surgical and radiological units serve both groups of patients, and the type of construction is such that when the need for hospitalization of cancer increases and the incidence of tuberculosis further declines, rooms can be reallocated from tuberculosis to cancer as required. Modern facilities are provided for the surgical and radiological treatment of all types of cancer, and all types of surgical treatment for tuberculosis patients will be given in the hospital. Out-patient service for both diseases will be maintained at the new unit.

In addition to the hospital building, the new construction provides a nurses' home, a central storehouse, and an addition to the power plant and laundry.

Pondville Cancer Hospital.—The work of the Pondville Hospital was continued on the same high level as last year. There were 1,437 admissions, 37 less than last year. This slight decrease was due to necessary repair work in one of the wards, which made it impossible for a short time to make use of all the beds. There was, however, a considerable increase in the work of all departments of the hospital. There was an increase of 13.7 per cent in the number of operations and an increase of 28 per cent in the number of X-ray treatments. The average period of hospitalization was 35.4 days. The out-patient department of the hospital established a new record with a total of 5,332 visits, an increase of 6.8 per cent over last year.

A new administration building is urgently needed to provide a recreation hall for employees and patients, room for expansion of the over-crowded record and business offices and laboratories, and to house a biological laboratory essential for cancer research. Plans for such a building have been prepared and we have requested an appropriation for its construction in the 1938 budget.

School Clinics.—During the school year, the Follow-Up Clinic examined 5,198 children who had been found to have some evidence of tuberculosis in the school clinics. Of these, 4,937 were found to be improved and 432 unimproved. Thirteen

were recommended for sanatorium care and 204 were recommended for summer camp care.

The Clinic also examined 813 students in the eight State Teachers Colleges and 450 students at the Massachusetts State College.

The analysis of much valuable information on the development of pulmonary tuberculosis in children has progressed steadily during the year and will soon be ready for publication.

Typhoid Fever.—This disease has continued at a low level, only 116 cases being reported, as compared with 135 in 1936 and 112 in 1935. It was anticipated in the fall that this would be a year in which we would for the first time see the number of cases drop below 100, but an outbreak in Stoughton of 15 cases and 2 deaths following a weekend party spoiled this hope for a record. The cause of this outbreak was found to be a typhoid carrier who prepared the meals served on this occasion.

Investigation of the 116 cases that occurred brought to light 16 typhoid carriers, and 4 convalescents whose stools had been positive for a year were added to the list, making a total of 128 known typhoid carriers in the State. Two carriers have died during the year, three were removed from the list following gallbladder operation, and three have moved out of the State.

Undulant Fever.—The past year has shown a drop in the incidence of recognized cases of undulant fever from the level of 55 in 1936 to 43 for this year. Two deaths from this disease have been recorded during the year. A large majority of these cases give a history of the habitual use of raw milk. Of the remainder, the majority give a history of having eaten at many different places and of having consumed milk about which they can give no definite information. The cases have been reported largely from the more sparsely settled areas, most of them being reported as solitary infections. Undoubtedly, a larger number of unrecognized infections which have not come to the attention of physicians have been present in these same areas.

The presence of this disease in the State continues to be one of the best arguments for the pasteurization of milk. The fact that the treatment of this disease is so unsatisfactory and that those suffering from the infection frequently continue to show symptoms over long periods of time gives additional grounds for insisting upon this method of protecting the health of the citizens of the State.

Whooping Cough.—This disease has been very prevalent during 1937, 13,700 cases having been reported, which is the highest number ever recorded for a single year. Along with the increase in incidence, the number of deaths again increased, but this number is smaller than was reported for 1934, even though the presence of the disease that year was less than the present year.

Gonorrhea and Syphilis.—There has been a continuation of the unusual activity in the field of genitoinfectious disease control which began with Surgeon General Parran's successful presentation of the problem to the public in July, 1936.

The Division of Genitoinfectious Diseases was created within the Department to replace the old Subdivision of Venereal Diseases which had been in existence since 1918 in the Division of Communicable Diseases.

During the year there have been received 5,856 reports of gonorrhea and 6,207 reports of syphilis. This is a decrease of 241 reports of gonorrhea and an increase of 683 reports of syphilis over 1936. While the interest that has been aroused over the control of syphilis may readily account for the large increase in reporting of that disease over the past two or three years, it is difficult to account for the steady decline in reported cases of gonorrhea. The peak of reporting of this disease was in 1931 when 7,201 cases were reported.

Approximately 3,300 cases have been reported as having prematurely discontinued treatment for gonorrhea or syphilis, or as having been the source of or in contact with infection. This is a decrease of less than 350 cases over the number reported in the same period last year. It was hoped that the appointment of additional follow-up workers to the various clinics would result in the cases being followed to a satisfactory conclusion without the intervention of the health officer.

A most forward step was taken in Massachusetts when legislation was passed this year, requiring the Department to establish and maintain clinics, which it

may do in cooperation with various local agencies, and permitting the Department to otherwise provide treatment for syphilis and gonorrhea for persons who are unable to pay for private medical care. This was a major recommendation of the Commission for the Revision of the Public Health Laws.

This law became effective in August, and an appropriation was made to finance the operation of this act for the balance of the year. Thus it has become possible for the Department to provide treatment for those who are unable to pay for private medical care and thus to make the identification of such individuals to their local boards of health unnecessary.

Any agency wishing to be reimbursed for maintaining a genitoinfectious disease clinic may make application for designation as a Cooperating Clinic. At the present time, twenty-one clinics have been designated as Cooperating Clinics, and applications have been received from six others.

There have been distributed 54,505 grams of arsenicals, as compared with 53,514 in 1936. In addition there have been distributed 10,854 ampoules of Mapharsen, which drug has been made available to clinics only, for the treatment of patients who cannot tolerate standard arsenicals. The total distribution of arsenicals in terms of arsphenamines has been 59,932 as compared with approximately 54,000 grams distributed last year.

Mapharsen is becoming more and more widely used throughout the country and is receiving a great deal of favorable comment.

Bismuth subsalicylate has been distributed to clinics and institutions to the number of 2,294 bottles. The distribution of this drug to private physicians was begun in July, and during the last six months 768 of the 12 cc. bottles have been distributed to them.

The Department has continued to adhere to its policy of encouraging treatment agencies to search for sources of infection and contacts and to keep the patient under regular treatment. Fourteen follow-up workers, or epidemiologists as they are called, have been added to the various clinic staffs during the past year, and others will be needed.

Following a conference of representatives of several Metropolitan Boston agencies which conduct prenatal or syphilis clinics, or both, a full-time epidemiologist was employed with funds contributed to the several cooperating agencies, whose full time is given to the follow-up of pregnant women with syphilis and their infants upon birth. Although this service did not become active until October, some sixty cases have already been registered with this worker and are being followed.

The Department has distributed 207,722 pieces of literature during the year, practically double the number distributed last year. Since the bulk of this material has been for public information, it appears that the Department is becoming somewhat more effective in putting informative literature into the hands of the people.

Many lectures have been given, and one fifteen-minute broadcast over Station WORL was given to the public concerning syphilis and gonorrhea.

The great majority of the newspapers of the State now print the words "syphilis" and "gonorrhea" without any objection. A number of series of articles on these diseases have appeared in several papers.

A Bulletin of Genitoinfectious Diseases is published once a month and is edited by the Massachusetts Society for Social Hygiene and distributed to 7,000 physicians in the State by this Department in cooperation with the United States Public Health Service.

Other Diseases.—One case of leprosy was discovered in an alien residing in New Bedford. This man will probably be sent to the Federal Leprosarium at Carville, Louisiana, for treatment, or on his request, deported to his native country, Portugal.

Two fatal cases of Pfeiffer's bacillus meningitis were reported, and undoubtedly others have occurred in the State but physicians have either failed to recognize them or do not realize that the disease is reportable.

Trichinosis continues to occur with too great frequency, 20 cases having been reported, two of them fatal.

Division of Biologic Laboratories.—Both the Wassermann Laboratory and the Antitoxin and Vaccine Laboratory show increases in their activities. The work of the Antitoxin and Vaccine Laboratory has been affected by the increasing im-

portance of pneumonia and the decreasing incidence of diphtheria. The expansion of the pneumonia program has greatly increased the volume and complexity of the work. The cost of antipneumococcic serum and the necessity of obtaining case histories have necessitated a more complex scheme for distribution. The number of vials distributed has increased approximately 60 per cent over last year. The distribution of diphtheria antitoxin continues to decrease due to the greatly lessened incidence of diphtheria. The distribution of toxin antitoxin has been discontinued for school children.

During the floods in January, at the request of the United States Public Health Service, we sent 87,000 cc. of vaccine to the flooded areas in Kentucky and Ohio.

The distribution of silver nitrate solution has been about 20 per cent higher than in 1936. This is undoubtedly due to the regulation requiring the use of this product in preference to other prophylactics for the prevention of ophthalmia neonatorum.

Wassermann Laboratory.—The number of specimens received has once more reached new high levels. Specimens for serological examination for evidence of syphilis show an increase of approximately 25 per cent, and the number of gonococcus complement fixation tests shows an increase of nearly 40 per cent. The number of specimens for agglutination tests for Brucella abortus has increased from 12,000 in 1933 to 25,000 in 1937.

Bacteriological Laboratory.—The total quantity of work has increased a great deal during the past year because of the large number of specimens examined in connection with the three paratyphoid outbreaks, the search for a carrier in the Grafton State Hospital, and the examination of food handlers in Simmons College, Mount Holyoke College and Williams College. Specimens from several outbreaks of dysentery also added to the work. There has been a considerable increase in the number of pneumonia specimens submitted and in the number of smears for gonorrhea.

The laboratory has continued to act as a training center for laboratory technicians who come for instruction in pneumococcus typing from laboratories approved for serum distribution.

There was a total of 76,996 separate examinations made upon specimens submitted during the year.

III. Hygiene

Division of Child Hygiene.—This Division has given much time and attention to maternal, infant and preschool hygiene.

Premature Infant Program.—The program to lessen the number of premature births and deaths continued to be an outstanding activity. It was considered of sufficient importance to convince the Legislature that steps should be taken to care for premature infants, and a law was passed early in the summer to provide for the care of infants prematurely born and for transportation of such infants to hospitals suitably equipped for their care, when requested by physician or parent. The law also required the reporting of such premature births to local boards of health. During the last month of the year, nine premature births were reported.

The work in this field included the establishment of hospital centers adequately equipped for the care of premature infants, according to the standards set up by this Department, and easily accessible to contiguous rural areas; notification of physicians of established hospital centers; and instruction in the care of premature infants for professional and lay groups. To date there have been established twenty-eight hospital centers for the care of premature infants.

An improvised transportation basket and an incubator have been devised, and a working drawing of the latter has been prepared, for demonstration use. The incubator is being tested at the Children's Hospital in Boston, and several hospital centers have made similar incubators and found them to be satisfactory.

A booklet entitled "Your Premature Baby" was published by the Department for use with mothers primarily, but is available also to physicians and nursing organizations.

Obstetric Package Project.—During the fall a project was started to make available to communities suitable obstetric packages. The Division furnished miniature packages to local women's organizations that agreed to make up complete full-sized obstetric packages for the use of physicians in home deliveries. These

packages are kept in some public place which is open day and night, to insure their being always available.

Maternal Mortality Study.—Plans were made and organization completed for a maternal mortality study to be conducted by the Section on Obstetrics and Gynecology of the Massachusetts Medical Society and financed by Federal funds allotted to this Division. It is planned to continue this study for a period of five years.

Well Child Conferences.—This year for the first time two Well Child Conference units worked throughout the entire year, with the exception of the month of August. Through these conferences, 55 towns were reached and 3,988 children were examined.

Prenatal and Postnatal Letter Service.—This service was continued as usual.

Mothers' Classes.—During the year, three new Mothers' Classes were organized.

Cooperation with Framingham Reformatory for Women.—This service, given by our Consultant Nurses, was continued during the year. In some instances the home visiting was done by the Division nurses personally; in other instances the Nursing Consultants contacted local nurses for home visiting to mothers and babies who had been discharged from the Reformatory.

Postgraduate Courses for Physicians.—In five centers of the State the Massachusetts Medical Society gave postgraduate lectures for physicians, five in pediatrics and five in obstetrics. These courses were financed by Federal funds. Two hundred ninety-three physicians enrolled and an average of 152 attended all sessions.

Refresher Courses for Physicians.—For physicians who were conducting or planning to conduct local well child conferences a refresher course was given with the assistance of the Harvard School of Public Health, the Boston Lying-In Hospital, and others. Four physicians attended this course and three completed it. Preference was given to physicians from rural areas of the State.

School Hygiene.—Service to Millville was continued in the reexamination of the school children, and there has been noted a marked lessening of physical defects. A school hygiene survey was made in the town of Hudson. A number of regional groups of superintendents of schools, school physicians and school committee members were organized. Four such group meetings were held during the year. Publication of "Contact" was continued. This publication is sent to superintendents of schools and school physicians. A course in health education for teachers was given at North Adams State Teachers' College. Service was given in the field of school hygiene by dentists, nursing supervisors, health education coordinator and other health education workers, by the parent education coordinator, nutritionists, and audiometer technician.

Teaching Center at Reading.—A staff nurse was assigned to the town of Reading to assist in the teaching center project, a project planned to afford opportunity for field training within the field of school health service. Among the duties required was assistance at a dental clinic for preschool service, follow-up of preschool children in preparation for school entrance, and assistance at physical examinations, audiometer testing and dental survey. Home visits were made on school children for correction of defects. During the year four nurses were assigned to this teaching center for observation and instruction in school hygiene.

Audiometer Testing.—During the first half of the year this work was carried on by the Consultant Nurses. In September an audiometer technician was appointed to assist in the program for testing the hearing of school children. The number of towns in which audiometer service was given totalled 105 during the year. The Consultant Nurses tested with the audiometer 21,840 children and retested 5,401 children. The audiometer technician tested 8,643 children and retested 1,424 during the last four months of the fiscal year. Of this number tested by the audiometer technician, there were found to be 429 children who needed medical attention.

In Mashpee the children who failed the third test were reexamined at the Massachusetts Eye and Ear Infirmary in a soundproof room, and the same results were obtained.

As far as possible, children who are found to have defective hearing are examined by an ear specialist, and operative procedures carried out where indicated.

Interest in this service was keen and the demand for audiometer testing continued throughout the year.

School Lunch.—This project was carried on throughout the year. One hundred and sixty towns were visited in the interest of the school lunch. Work was carried on in 144 schools and 84 talks on the school lunch were given by the nutritionists. A one-week conference for school lunch managers was held at Fitchburg State Teachers' College, with an attendance of 28. As a result of this project, new lunchrooms have been organized in the schools, more protective foods were introduced into the school lunches, and record forms for keeping cost accounts were introduced into a number of schools.

Public Health Nursing.—At Simmons College scholarships were given to 15 nurses, and one was given at Columbia University, financed by Federal funds. Refresher courses were granted to two nurses by the Commonwealth Fund.

Surveys.—The Public Health Nursing Supervisors conducted surveys of available nursing services in the towns of their districts, and 28 were completed during the year. Stress was laid upon the necessity for adequate record systems covering nursing services, and consultation service was afforded the local nurses and nurse-employing agencies.

Institutes for Nurses.—In Berkshire and Franklin counties a Nutrition Institute was conducted for the local nurses in that section of the State. Other institutes were held for the staff nurses, the subjects for discussion being "Nurse Supervision" and "Nutrition."

At Essex County Sanatorium a Tuberculosis Institute was held for nurses from eight surrounding towns.

Home Visits.—Following the well child conferences, home visits were made by the Public Health Nursing Supervisors in those towns where no local nursing service was available. The total number of visits thus made was 1,303.

General Nursing Service.—A total of 96 lectures were given by the Public Health Nursing Supervisors and other nurses of the Division during the year.

Community Demonstrations.—Generalized nursing service has been established in Pembroke and Sturbridge.

New England States Teaching Center.—The teaching center service was discontinued the end of June but the service to premature baby clinic, with home visiting, was carried on throughout the year. Nursing service was demonstrated to physicians and medical students taking the course.

Nutrition.—Two nutrition demonstration projects were carried on during the year, one in Southern Worcester County and another in Barnstable County. In both counties numerous conferences were held with various organizations in the field of health, welfare, school and social service, and home visits were made in special instances upon request.

In Chicopee nutrition service was given to a group in special need.

Dental-Nutrition Program.—In the town of Reading the dental-nutrition program was carried on. This included 76 children representing 63 families.

State Sanatoria Service.—At the State sanatoria for tuberculosis at Westfield and North Reading the service of a nutritionist was continued and included visits at intervals throughout the year.

State Teachers' College.—At the request of the State Department of Education, the Division participated in the courses in nutrition given during the summer at Fitchburg State Teachers' College.

Institutes.—Nutrition institutes were held for public health nurses of Berkshire and Franklin counties.

General.—A number of nursery schools were visited and given nutrition advice and service. Summer camps were given similar service.

Dental Hygiene.—The services of the dentist assigned to Massachusetts by the United States Public Health Service were continued during the early months of the year.

A plan of dental health education was developed to make the best use of all health and education workers in schools. Dental health units for the elementary and junior high school grades were planned and printed and are now being introduced into public and parochial schools of the State.

Surveys and studies were made of community dental programs in four com-

munities and in two health districts. A study was made of the program of dental hygienists employed in the State, and work was begun on the development of a state-wide program in dental hygiene, with local dentists participating.

Health Education.—Through the Teacher Training Coordinator of Health Education, consultation service was given to superintendents of schools and school principals, and lecture discussions were made available to teachers. Cooperation with the State Department of Education has been continued through the Committee on Health Education in Secondary Schools.

The Supervisor of Health Education executed a large number of pieces of new illustrative material. Exhibits were planned and executed on various subjects and were displayed at the Eastern States Exposition in Springfield and at 18 local fairs and 18 additional conferences. From all the fairs, there were received 1,594 requests for printed pamphlets, and the number of pieces so distributed totalled more than 13,000 copies.

Four issues of the Department quarterly bulletin, *The Commonhealth*, were printed during the year. These special numbers were on the following subjects: "Final Report of Massachusetts Pneumonia Study and Service;" "Diabetes;" "Health Education;" and "Handbook for Physicians."

Parent Education.—The chief project of the work in parent education consisted in the selection and training of 30 lay leaders throughout the State.

Twenty-eight community projects were carried on in communities and filled a distinct need. Eighteen were with Mother Groups and three were Parent Institutes. One of the most interesting projects undertaken by one leader is a three-year course in parent education under the joint auspices of the Newton public schools and the Newton Health Department with the Division of Child Hygiene.

In connection with this work the Coordinator in Parent Education gave a total of 114 lectures to date. Courses of four lectures each were given to public health nurses in seven districts.

Many group conferences and conferences with individuals were held for the discussion of parent education problems.

Reading Disability Study.—There were examined in selected communities 100 cases of reading disability in grades above the second, with the use of experimental materials and devices.

Records were compiled for the study of certain aspects of the reading problem and experiments were carried on with technique both for testing and for correcting handicaps.

In the first and second grades 700 children were given reading aptitude tests and eye examinations. Photographic records were made of the eye movements of 106 children who have difficulty in reading.

The head of this project directed the retraining work done by the teachers and gave lectures to parents.

Reports were submitted to superintendents of schools and the cases were followed with some classroom supervision.

Division of Adult Hygiene.—The loss to cancer work in the death of Dr. Robert B. Greenough on February 16, 1937, cannot be overestimated. A member of the Cancer Advisory Committee from its inception, Dr. Greenough exerted a decisive influence on the development of the program as it is today. The Cooperative Cancer Control Program was of intense interest to him, and was presented by him to various professional groups throughout the United States. He repeatedly said that he felt that this thorough and penetrating approach to the problem of cancer education, even though it entailed endless labor and an enthusiastic personnel, must be the ultimate method employed generally if sound results were to be expected in this field of cancer control.

Epidemiology and Biometrics.—Epidemiology and biometrics comprise an integral part of the activities of the Division. It is in this section that data regarding cancer and other chronic diseases are collected, tabulated, and analyzed. The facilities for care and treatment are studied, the activities of the cancer clinics are appraised, and the effects of educational programs are determined.

Biometric Research.—Data for research are obtained from the death records, hospital records, clinic records, questionnaires to physicians, and house-to-house visits. This material is transferred to punch cards and tabulated.

Cancer Mortality Study.—A study of one third of the individuals who died of cancer in Massachusetts in 1932, to elicit the accuracy of cancer death records, was made. The report was presented at the last meeting of the American Public Health Association. The data were collected by visits to the homes of the individuals who had died of cancer, to all the physicians who had seen them, and to the hospitals they had attended. By combining the information it was possible to estimate how many of the records certified as cancer were not and how many of the records certified as a particular type of cancer were inaccurate. A study of the autopsy records at one of the larger Boston hospitals showing the comparsion between clinical and autopsy diagnoses furnished an estimate of missed cases. This paper has furnished the first clear-cut indication of the amount of dependence that can be placed on the mortality records in Massachusetts, and the high degree of accuracy found is a testimonial to the efficiency of the State Registrar of Vital Statistics and the physicians of Massachusetts.

Cancer Morbidity Study.—For the past five years, biometric research has been conducted to determine what, if any, environmental factors are associated with cancer. A preliminary report on this piece of research will be available within the coming year.

Cancer Hospital Study.—Since the inception of the Massachusetts Cancer Program the cancer records of approximately eighty general and cancer hospitals have been studied at five-year intervals. During the present year the third such study has been made, using the admissions to hospitals in 1935. It was found that in the ten-year period the cancer deaths in Massachusetts increased 25 per cent while the increase in hospitalization for cancer in the State was over 80 per cent.

Study of Hereditary Aspects of Cancer.—The question most frequently asked in public meeting is, "Is a person whose father or mother died of cancer apt to get the disease?" Many reports have come out from various laboratories within the past few years, some of which point strongly toward a genetic influence. Inasmuch as all these experiments have been based on animals inbred for generations and inasmuch as such intensive inbreeding is not practiced by the human race, it was thought advisable to determine by biometric research as nearly as possible the effects of cancer history. The results of this hereditary study will probably be available during the coming year.

Statistical Presentation of Diabetes in Massachusetts through 1936.—The report on the statistical and epidemiological findings regarding diabetes which was first published in the "Diabetic Number" of *The Commonhealth* in 1934 was rewritten and published in the spring issue of 1937. This paper covered the mortality rates from 1860 to 1936, the changing age incidence of the disease, and furnished information on disability, hospitalization, duration of the disease, and certain associated environmental factors.

Arthritis Studies.—Biometric research similar to that used in the cancer morbidity study has been carried on synchronously with that study. The arthritis records were obtained from the arthritis clinics in Boston and the controls were the same as collected for the cancer study, only those being used that matched the arthritis cases for age and sex.

Another study of a somewhat similar nature is being conducted by the physicians in charge of the State arthritis work at the Massachusetts General Hospital.

Supervision of Statistical Methods.—All research papers prepared by physicians at the Pondville Hospital in which statistics are used are reviewed by the Division to determine the statistical soundness of the conclusions drawn.

When members of the staff desire statistical material for papers, they inform the statistical staff of their needs, and the best methods for obtaining the data are determined. During the past year, the five-year cures have been collected and tabulated.

Punching and Tabulating of Data for Other Divisions.—Punching and tabulating of data have been done during the past year for the Pneumonia Service and Crippled Children's Program, and tabulating for the Division of Genitoinfectious Diseases.

Study on the Duration of Life of Cancer Patients.—The fallacy that individuals who have cancer must die with the disease is rapidly being relegated to the past with other superstitions. Records are now available for the number of individuals

alive who have attended the cancer clinics. With approximately one quarter of all cancer cases alive ten years after coming to the clinic, and with the average symptoms of nearly a year's duration before coming to the clinic, the assumption is justified that much more is being accomplished than is realized by the general public.

State-Aided Cancer Clinics.—The State-aided cancer clinics have continued to function as group consultation clinics. The physicians of the State have shown their appreciation of the Massachusetts Cancer Program by referring an ever-increasing percentage of cancer patients to the clinics. Two new cancer clinics have been opened—one in January at Fall River, and the other in December at the Westfield State Sanatorium—thus bringing the number of State-aided cancer clinics to twenty-one. All these clinics furnish group diagnosis, free diagnostic X-ray service to the indigent, social follow-up, uniform records, and all but one, teaching clinics. The larger clinics meet once or twice a week, the smaller ones twice a month.

Teaching Clinics.—During the year, sixty-nine teaching clinics were held, a 50 per cent increase from the preceding year.

Tenth Anniversary Celebrations of Cancer Clinics.—Tenth anniversary celebrations of the opening of cancer clinics were held at Worcester, Lynn, and Pondville.

Social Service.—A new social worker was appointed and assigned to the Rutland State Sanatorium. With this appointment and authorization for a social worker for Lakeville, the tuberculosis districts were revised so that each sanatorium should have a social worker primarily responsible for service to that institution. In the spring, however, it was necessary to reorganize the tuberculosis social work and assign to three of the social workers responsibility for the Crippled Children's Clinics in their districts and to assign to the social workers in the Crippled Children's Services the tuberculosis work in one of the remaining districts.

Pathological Diagnostic Service.—The work of the Tumor Diagnostic Service has continued to increase. In 1934, 2,528 specimens were examined, and in 1937, 3,216, an increase of 27 per cent. A gratifying feature of this increase is that it has not come from one hospital but continues to come from an increasing number of hospitals and physicians throughout the State.

Monthly Cancer Bulletin.—The mailing list for this bulletin continued to grow. Two hundred and eighty-four physicians had their names added to the mailing list during the year. It is now being sent to approximately 2,600 physicians, all of whom requested that it be sent to them.

Cooperative Cancer Control Committees.—The educational program for the dissemination of information concerning cancer consists of the teaching of exact knowledge by an authority in the person of the family physician to the individual as one of a small group. To accomplish this in a State of more than 350 communities, with a population of nearly four and one-half million, and over 7,000 physicians, each community in the State has, or is in the process of having, a Cooperative Cancer Control Committee. Two hundred and sixty of the communities of the State are now organized. The membership of these committees is made up of a representative from every group in the community. Each group represented is expected to have one meeting a year for a discussion of cancer, and a local physician is invited to give the talk. The local physician is the one who is asked to be the teacher in this program because the decline or increase in early detection of cancer is entirely in his hands.

At the present time representatives of 5,332 organizations have agreed to serve on the Cooperative Cancer Control Committees and urge their respective clubs to have annual talks on cancer by local physicians.

The incomplete returns indicate that during the past year over 10,000 individuals have been given talks on cancer by their local physicians and an additional 2,000 individuals have heard organization talks given by members of the Department. Such figures as are available warrant the assumption that over 20,000 people will have been reached with cancer talks during the year, not including those that have been given over the radio.

During the first eight years of the Cancer Program the interval of delay between first recognizable symptoms on the part of the patient and consultation with first physician remained near six months. At no time did it go under 6.0 and most

of the years it varied from 6.1 to 6.5. The new program was started in the fall of 1934. No effect was felt in 1935, but in 1936, with nearly half of the State organized, the delay dropped to 5.0 months and for the first six months in 1937 it was 4.8. Both the Huntington and the Palmer Memorial Hospitals have shown an increase in attendance at their out-patient clinics, and the attendance of cancer patients at the State-aided cancer clinics has increased.

Contacts with Physicians in Connection with Cooperative Cancer Control Committees.—Members of the Cooperative Cancer Control Committees and the physicians who speak are interviewed personally as well as in organization meeting. Over 90 per cent of the physicians have volunteered to speak, and the Department has endeavored to keep them supplied with sufficient literature for their information.

The enthusiastic response of the profession and the public, together with an appreciable decrease in delay on the part of cancer patients, warrants the assumption that the Massachusetts Cancer Program as now conducted is best meeting the needs of the State.

IV. Environmental Control

Division of Sanitary Engineering.—This Division has received 994 applications for advice in connection with the regular work of the Department, which is 137, or 16%, in excess of the number received in 1936. Of the total number received, 207 related to municipal and other public water supplies, 263 to water supplies at dairies, semi-public water supplies, or supplies examined at the request of the local boards of health, 28 to water supplies at schools, 67 to water supplies at recreational and other camps, 7 to sources of ice supply, 45 to public bathing and wading and swimming pools, 36 to shellfish, 16 to pollution of streams, 84 to sewerage and sewage disposal, 159 to cross connections and 83 in relation to miscellaneous matters. These applications required field examinations by the engineers and in most cases chemical analyses and bacterial and microscopical examinations under the direction of the Water and Sewage Laboratories and the Lawrence Experiment Station, or both.

The Division also has been active in connection with certain environmental control studies financed with funds from the United States Public Health Service. In connection with these studies investigations have been made of some of the roadside stand water supplies; work has been continued in connection with cross connections; examinations have been made of watershed areas; and experimental work has been continued relative to filtration of the water of the Merrimack River at the Lawrence Experiment Station. Examinations also have been made under these funds relative to conditions of water supply and sewage and waste disposal in rural sections.

Rainfall.—The rainfall for the year, as recorded by seven long-term well-distributed rainfall stations throughout the State which are under the supervision of this Division, was 47.36 inches, which is 2.75 inches in excess of the normal. There were deficiencies in rainfall in the months of February, March, July and September. The greatest excess in any one month was in November and the greatest deficiency was in July. The rainfall for the climatological year ending September 30, 1937, was 46.12 inches, which is 1.54 inches in excess of the normal for this period.

Flow of Streams.—The excess in rainfall throughout the year has resulted in a more than average flow of the Merrimack River from January to October, inclusive. The only times in this period when the flow was less than normal was during the months of March, April and October. It is to be expected that similar conditions of flow will be shown in connection with other streams of the State when final records are available.

Water Consumption.—The water consumption records of the Metropolitan Water District for the year, where approximately one and one-half million persons are supplied, show that there was a slight decrease from the consumption during the previous year. A decrease in water consumption for the same period was also experienced in most of the other municipalities of the Metropolitan Water District. The decrease during the winter months was due to a large extent to the mild winter.

The only threatened water shortage was experienced in the town of Weston where tests were made for the purpose of driving additional tubular wells to meet the summer demands, but it was not necessary to connect these wells to the system.

The highest elevation reached on Wachusett Reservoir between January 1 and November 30, inclusive, was 396.73 on May 18, 1937. The lowest elevation reached by the surface of the water in this reservoir was on November 13, 1937, when it was at elevation 386.78, which is 8.22 feet below the spillway at the dam. The amount of storage in the reservoir at this elevation is 54,265.62 million gallons. There was diverted into Wachusett Reservoir during the year from the Ware River 1,052 million gallons of water, this diversion occurring in the month of January.

Public Water Supplies.—Additions and improvements have been made in nine different cities and towns; treatment works were completed or were under way in seven communities; and chlorinators and ammoniators have been installed in eight cities and towns.

Pollution of Streams.—In spite of the fact that the rainfall throughout the State as a whole was in excess of the normal, complaints were received relative to the pollution of the following streams: Aberjona River in Winchester, Black's Creek in Quincy, Charles River at Newton and Watertown, Housatonic River at Lee, Johnson's Creek in Wareham, Mill River at Northampton, Mystic River in Medford and Somerville, Neponset River at Hyde Park, Tinker Brook in Huntington, Taunton River in Mount Hope Bay, and Salisbury Plain River in Brockton.

The pollution of the Aberjona River in Winchester was so acute in the early part of the summer that the matter was referred by the Department to the Attorney General, but steps taken by a contractor engaged in the construction of the North Metropolitan relief sewer and by the Sewerage Division of the Metropolitan District Commission in preventing further overflow of sewage from the Metropolitan sewers in that town made action by the Attorney General unnecessary.

The work of the Division in an advisory capacity in connection with a stream pollution investigation, conducted as a Federal W.P.A. Project, was continued during the year. A report relative to this investigation is to be submitted to the Legislature.

Such analyses as are available to the Division at the present time show that there was a slight improvement in the general condition of the Blackstone River as compared with the previous year. Analyses, however, indicate that the Connecticut River in some parts of its course was in a slightly more polluted condition. The results of the analyses of the water in the Merrimack River showed no substantial change.

Sewage Disposal.—During the year a new sewerage system and sewage disposal works consisting of an Imhoff tank and sand filters were placed in operation in the town of Barnstable for the village of Hyannis. At Framingham additional works consisting of Imhoff tanks and trickling filters were nearing completion at the end of the year. The new activated sludge plant at Leominster is practically completed and a portion of these sewage treatment works is now in operation. At Pittsfield the new trickling filter plant has been completed and was placed in operation during the latter part of the summer. In the town of Nantucket certain additions have been made to the sewage filters.

The Division also has prepared plans and has carried on certain construction work in connection with sewage disposal and in connection with water supplies at various State institutions.

Special Investigations.—During the year the Division of Sanitary Engineering has been called upon to participate in the following special investigations:

Chapter 13 of the Resolves of 1937. Improvement of conditions at Musquashiat Pond in Scituate.

Chapter 21 of the Resolves of 1937. Relative to dredging and deepening the channel of a part of the Neponset River in the town of Norwood.

Chapter 28 of the Resolves of 1937. Relative to means and methods of remedying the pollution of Hardy Pond in Waltham.

Chapter 32 of the Resolves of 1937. Relative to the construction of additional sewers in the North and South Metropolitan Sewerage Districts.

Chapter 48 of the Resolves of 1936. Relative to improving the distribution of

water and more adequately preventing pollution of the sources of water supply of the Metropolitan Water District.

Chapter 51 of the Resolves of 1937. Relative to protecting the purity of interstate waters used for drinking purposes.

Chapter 60 of the Resolves of 1937. Relative to certain problems in the Merrimack Valley, so called.

Chapter 66 of the Resolves of 1937. Relative to an investigation by the Department of Public Health in cooperation with the Works Progress Administration of the sanitary condition of certain rivers within the Commonwealth.

Reports on these studies have been submitted to the Legislature.

Camps.—The Engineering Division has continued its program of assisting the authorities of the Civilian Conservation Corps Camps by making bacterial examinations of the various sources of water supply in use at these camps, and in addition an investigation has been made with Federal funds of overnight and trailer camps in the southeastern section of the State. The results of this latter investigation showed a total of 141 camps in Barnstable, Bristol and Plymouth counties, with accommodations for about 4,413 persons. This investigation also showed that the facilities for water supply and sewage disposal at camps previously examined have improved considerably since the earlier investigation and that most of the recommendations by the Department have been carried out.

Shellfish.—During the past summer, parts of two areas, Hyannis and Cohasset harbors, which have been closed, were reopened for the taking of shellfish. Several areas were approved for the taking of shellfish for purification purposes. Two areas were closed for the taking of shellfish because of evidence of increased pollution.

The Division assisted in the examination of certain shellfish meat establishments and the examination of the water supply used at these establishments. The results of the examination show that in some instances it was a practice to take water from polluted sections of Boston Harbor for washing containers, benches, and utensils.

During the year, seven shellfish cases were brought into the courts because of violations, and six convictions were obtained.

During the year, 323 out-of-state shellfish shippers have been approved and one has been disapproved, and 350 shucking plants were examined for certification purposes. Of this number, 337 were found satisfactory and 13 unsatisfactory. A total of 1,257 shellfish handling establishments were examined.

Cross Connections.—During the current year an extensive investigation has been made of piping conditions in industrial plants so far as they relate to cross connections between fire and industrial water supplies and supplies used for drinking. A total of 901 industrial plants were examined and of this number, conditions were found to be satisfactory at 385, and conditions were found to be unsatisfactory at 516 plants, or at 57.3% of those examined. New double check valve installations have been made at 103 plants. When the Division is advised that conditions have been changed in accordance with the Department's recommendations, it is the practice for an engineer from the Division to reexamine the plant.

In addition to the usual industrial plant examinations, a special study has been made of the cross connection conditions in certain State institutions and public buildings. The report of the conditions found shows that in the State institutions and public buildings examined, there are improper plumbing and piping conditions which may result in pollution of drinking water supplies, indicating that similar conditions may exist in other State institutions and public buildings. As a result of this study, legislation to remedy these conditions is to be introduced by the Examiners of Plumbers.

As a part of the work of the Division relative to cross connections a pamphlet has been published, entitled *Suggested Double Check Valve Equipment for Fire-Service and Industrial Supply Connections.* Under date of February 9, 1937, the Department adopted rules and regulations relative to cross connections.

Water and Sewage Laboratories.—In carrying out the regular work of the Water and Sewage Laboratories during the year, 9,292 chemical and 3,620 microscopical analyses were made in connection with the oversight of water supplies and sewage disposal works and in connection with the pollution of streams.

Several special studies were carried on in these laboratories, which appear in the detailed report of the Division.

Lawrence Experiment Station.—At the Lawrence Experiment Station, 15,360 bacterial examinations, including 475 examinations of shellfish, 2,552 chemical analyses, including 188 industrial wastes and 154 sand analyses, were made during the year. Of the chemical analyses, 2,447 were in connection with the regular work of the Department, and 105 in connection with the work under Federal funds. Of the bacterial examinations, 13,633 were in connection with the regular work of the Department and 1,727 in connection with the work done under Federal funds.

The operation of the shellfish purification plant at Newburyport was checked by the analysis of frequent samples, and a bacteriologist from the Station was in court six times in connection with prosecutions for the sale of polluted shellfish and once concerning a stream pollution case.

A large amount of work was done in testing the various methods of determining pollution of shellfish.

Food and Drugs.—The Division has been able to do more inspection of restaurants and food establishments as two new inspectors were employed out of Federal funds.

Eighteen thousand eight hundred and thirty-five samples were examined in 1937, which is an increase of about 1,500 over the previous year.

The prosecutions have dropped, due largely to improvement in the milk supply. There were 286 cases prosecuted, resulting in 254 convictions, not including the shellfish cases. Of these cases, 132 pertained to meat; 40 to sanitation in food establishments; 30 to the adulteration of food other than milk; 29 to the violation of the rules and regulations pertaining to pasteurization; 26 to chemical and bacteriological composition of milk; 18 cases were for violation of the mattress laws; 6 cases for violation of the drug laws; 3 cases for violation of the slaughtering laws; 1 case for violation of the cold storage laws; and 1 case for obstruction of an inspector.

The average of the chemical composition of milk was slightly higher than was reported last year; and the adulterated samples were less than ever before in the history of the Department. Of the 6,984 samples examined, only 36 showed partial removal of cream, and only 24, representing $\frac{1}{3}$ of 1 per cent of the total samples, contained added water. The bacteriological examinations of milk showed up fairly well. Eight thousand and ninety samples were examined. Of the raw milk intended for pasteurization, 56 per cent had counts below 100,000. The geometric mean of the bacteria count of all the raw milk intended for pasteurization was 70,078. Sixty per cent of the pasteurized milk had counts less than 25,000. The geometric mean of the counts of all pasteurized milk was 20,286.

After experimenting for some time on the various modifications of the phosphatase test the Division finally adopted the one used by the New York City Health Department as being the best adapted for the detection of milk not heated to a temperature of 142° for a period of not less than 30 minutes. It has been known for some time that certain milk dealers were manipulating the recording thermometer charts, thus showing apparently correct pasteurization. The first samples to be tested by the phosphatase test were obtained from persons suspected of manipulating these charts. All the prosecutions have resulted in convictions.

Sanitary inspections were made as follows: Pasteurization Plants, 1,445; Bakeries, 794; Restaurants, 532; Soft Drink Plants, 470; Ice Cream Plants, 187; Certified Dairies, 15.

During the month of July, complaints were received relative to sickness apparently traced to opened lobster and crab meat. Sanitary inspection of these establishments showed in general that they were far from being clean; and that the methods of opening and packing the lobster and crab meat were such that there was liability of infection. Bacteriological examination showed excessively high counts, but we were unable to isolate the specific bacteria which might have been the cause of the sickness. A change in the Sanitary Food Law giving the Department the right to make regulations as to conditions under which food may be manufactured for sale would possibly have a tendency to reduce this occasional type of sickness.

It was necessary to revoke the licenses of a few out-of-state ice cream plants

and soft drink plants; and to revoke a license of a soft drink plant operating within the Commonwealth. In general, however, both out-of-state plants and those within the State are much improved over the preceding year.

Eight samples of Vitamin D milk were examined, three of which were found to be below the potency specified on the label.

V. Personnel

There have been two changes in the membership of the Public Health Council during the past year. Dr. Sylvester E. Ryan, who has been a member since 1920, refused reappointment on account of ill health. On May 12 the Governor appointed Dr. Charles F. Lynch of Springfield to succeed Dr. Ryan, and on June 23 Dr. George D. Dalton of Quincy was appointed in place of Mr. Gordon Hutchins who has served since 1926.

Dr. Gaylord W. Anderson, a member of the staff of the Division of Communicable Diseases for eight years, for the last six of which he served as Deputy Commissioner and Director of Communicable Diseases, resigned on August 31 to accept a position as Professor of Preventive Medicine and Public Health at the University of Minneapolis. On September 1 Dr. Alton S. Pope assumed the duties of Deputy Commissioner in addition to his position as Director of Sanatoria and Tuberculosis, and Dr. Roy F. Feemster, Assistant Director of Biologic Laboratories, was appointed Director of Communicable Diseases.

Dr. Wilson G. Smillie, who has rendered valuable service to the Department as Epidemiological Consultant since 1929, resigned on September 1 to become Professor of Public Health at Cornell University.

On June 1 Dr. Nels A. Nelson, Assistant Director of Communicable Diseases, was promoted to the position of Director of the recently created Division of Genitoinfectious Diseases.

Dr. Charles B. Mack, who had held the position of District Health Officer of the North Metropolitan District for seven years, died on January 22. His position was filled on June 1 by the appointment of Dr. Charles E. Gill, formerly Supervisor of Tuberculosis Clinics. On February 1 Dr. A. Daniel Rubenstein was appointed Epidemiologist in the Division of Communicable Diseases to fill a vacancy caused by the promotion of Dr. B. Barrett Gilman to the position of Assistant Director of Communicable Diseases. On October 25 Dr. Frank R. Philbrook joined the staff as Epidemiologist and was assigned as field director of the pneumonia control program, this additional position being made possible through Federal funds. The same fund made it possible to employ Dr. Solomon L. Skvirsky as Epidemiologist to assist in a maternal mortality study in cooperation with the Massachusetts Medical Society.

The resignation on November 30 of Dr. Mary R. Lakeman as Epidemiologist in the Division of Adult Hygiene was received with regret, Dr. Lakeman having been a member of the Department staff since 1918. On December 1 Miss Eleanor J. Macdonald was appointed to fill this position. With the aid of Federal funds it was possible to employ an Assistant Director of the Division of Adult Hygiene, and Dr. Frederick G. Medinger was appointed to this position on July 1.

On January 22 Dr. Catherine F. Ronan joined the staff of the Division of Child Hygiene as Public Health Dental Supervisor, a new position financed by Federal funds.

VI. Organization

The organization of the Department is as follows:

Commissioner of Public Health 1

Public Health Council 6

Division of Administration:

Secretary (1), Epidemiological Consultant (1), Clerks and Stenographers (13)

(Social Security): Assistant Director of Public Health Administration (1), Supervisor of Clinics for Crippled Children (1), Epidemiologist (1), Public Health Nursing Supervisors (8), Public Health Social Work Supervisors (2), Bracemaker (1), Clerks and Stenographers (4) 33

Division of Adult Hygiene:
Herbert L. Lombard, M.D., Director.
Epidemiologists (3), Social Workers (3), Public Health Education Workers (2), Clerks and Stenographers (15)
(Social Security): Assistant Director (1), Clerks and Stenographers (2), Statistician (1) 28

Division of Biologic Laboratories:
Elliott S. Robinson, M.D., Director.
Assistant Director (1), Chemists and Bacteriologists (11), Laboratory Assistants (3), Laboratory Helpers (8), Stable Foreman (1), Laborers (15), Janitors (2), Clerks and Stenographers (6)
(Social Security): Chemist and Bacteriologist (2), Laborer (1)
Wassermann Laboratory:
Chief of Laboratory (1), Bacteriologist (1), Laboratory Technician (1), Laboratory Assistant (1), Laboratory Helpers (6), Clerks and Stenographers (3)
(Social Security): Bacteriologist (1), Laboratory Helpers (2), Clerks and Stenographers (2) 69

Division of Child Hygiene:
M. Luise Diez, M.D., Director.
Child Welfare Physicians (2), Epidemiologist (1), Public Health Dental Hygienist (1), Public Health Nutrition Workers (4), Public Health Education Workers (2), Public Health Nursing Supervisors (6), Clerks and Stenographers (15)
(Social Security): Assistant Director (1), Child Welfare Physicians (2), Public Health Dental Supervisor (1), Public Health Nutrition Workers (4), Public Health Nursing Supervisors (7), Teacher Training Coordinators (2), Head of Research Learning Project (1), Research Assistant (1), Infant Welfare Field Nurses (4), Audiometer Technician (1), Clerks and Stenographers (11) . . . 67

Division of Communicable Diseases:
Roy F. Feemster, M.D., Director.
Assistant Director (1), District Health Officers (8), Epidemiologists (2), Clerks and Stenographers (8)
(Social Security): Epidemiologists (2), Health District Sanitary Officer (1), Laboratory Technician (1), Laboratory Helper (1), Clerks and Stenographers (3)
(Diagnostic Laboratory):
Bacteriologists (5), Laboratory Assistant (1), Laboratory Helper (1), Laborer (1), Clerks and Typist (2)
(Social Security): Bacteriologist (1) 39

Division of Genitoinfectious Diseases:
Nels A. Nelson, M.D., Director.
Epidemiologist (1), Public Health Education Worker (1), Clerks and Stenographers (6)
(Social Security): Epidemiologist (1), Public Health Nursing Supervisors (2), Clerks and Stenographers (2) 14

Division of Food and Drugs:
Hermann C. Lythgoe, Director.
Chief of Laboratory (1), Chemists and Bacteriologist (5), Inspectors (14), Laboratory Helpers (2), Laborer (1), Clerks and Stenographers (7)
(Social Security): Inspectors (2), Clerk and Stenographer (1), Laboratory Technician (1) 35

Division of Sanitary Engineering:
Arthur D. Weston, Director and Chief Sanitary Engineer.
Engineers and Engineering Assistants (16), Clerks and Stenographers (12)
(Social Security): Engineering Assistants (6), Clerks and Stenographers (3)
(Water and Sewage Laboratories):
Laboratory Coordinator (1), Chiefs of Laboratory (2), Chemists and

Bacteriologists (10), Laboratory Assistant (1), Mechanical Handyman (1), Laborer (1), Watchman (1), Clerks and Stenographers (4) (Social Security): Chemist (1) 60

Division of Tuberculosis:

Alton S. Pope, M.D., Director and Deputy Commissioner.

Assistant Director (1), Epidemiologist (1), Superintendent of Sanatoria Construction (1), Inspector of Settlements and Support Claims (1), Social Workers (2), Field Nurse (1), Clerks and Stenographers (10) (Social Security): Social Worker (1), Clerks and Stenographers (4)

(Tuberculosis Clinics):

Supervisor of Tuberculosis Clinics (1), Child Welfare Physicians (2), Field Nurses (4), Public Health Nutrition Workers (2), X-ray Clinic Field Agents (2), Clerks and Stenographers (6) 40

Total 392

VII. Publications

The following articles by members of the staff have been published:

Division of Administration

The Shattuck Lecture: The Diseases of the Inhabitants of the Commonwealth—
Henry D. Chadwick, M.D.
New England Journal of Medicine, 216: 1003–1015, June 10, 1937.

The Effect on the Family Tuberculosis Program of Lessened Health and Welfare Budgets—
Henry D. Chadwick, M.D., and Mary Spalding
Medical Woman's Journal, 44: 71–74, March, 1937.

What Massachusetts Is Doing for the Crippled Child—
Edward G. Huber, M.D.
New England Journal of Medicine, 216: 258–260, February 11, 1937.

Services for Crippled Children in Massachusetts—
Edward G. Huber, M.D.
The Physiotherapy Review, 17: 131–133, July–August, 1937.

Division of Adult Hygiene

Prevention of the Degenerative Diseases—
Herbert L. Lombard, M.D.
Chapter in "The Practitioners Library of Medicine and Surgery," 12: 859–894, Preventive Medicine and Hygiene, 1937.

Lessons from the Massachusetts Cancer Program—
Herbert L. Lombard, M.D.
Journal of Connecticut State Medical Society, 1: 391–392, August, 1937.

A Comparison of the Cytoplasmic Changes Induced in the Walker Rat Carcinoma 256 by Different Types and Dosages of Radiation.
I. The Golgi Apparatus—
Lloyd C. Fogg, Ph.D., and Shields Warren, M.D.
American Journal of Cancer, 31: 567–577, December, 1937.

A Comparison of the Cytoplasmic Changes Induced in the Walker Rat Carcinoma 256 by Different Types and Dosages of Radiation.
II. The Mitochondria—
Lloyd C. Fogg, Ph.D., and Shields Warren, M.D.
American Journal of Cancer, 31: 578–585, December, 1937.

Cutaneous Metastases of Malignant Disease—
Olive Gates, M.D.
American Journal of Cancer, 30: 718–730, August, 1937.

Effect of Gamma Radiation on Mitosis—
Shields Warren, M.D.
American Journal of Roentgenology and Radium Therapy, 38: 899–902, December, 1937.

Pathology of Diabetes Mellitus—
Shields Warren, M.D.
New Orleans Medical and Surgical Journal, 90: 260–262, November, 1937.

Division of Biologic Laboratories

Hemolytic Streptococcus Toxins and Antitoxins. V. Titration by the Flocculation Reaction—
Leo Rane and Louise Wyman
Journal of Immunology, 32: 321–333, April, 1937

The Antiserum Treatment of Pneumonia from the Standpoint of Public Health—
Elliott S. Robinson, M.D.
New England Journal of Medicine, 216: 459–460, March 18, 1937.

A Quantitative Study of the Ramon Diphtheria Flocculation Reaction—
Alwin M. Pappenheimer, Jr., and Elliott S. Robinson, M.D.
Journal of Immunology, 32: 291–300, April, 1937.

Production of Potent Diphtherial Toxin on a Medium of Chemically Defined Composition—
Alwin M. Pappenheimer, Jr., J. Howard Mueller and Sidney Cohen
Proceedings of the Society for Experimental Biology and Medicine, 36: 795–796, June, 1937.

Hemolytic Streptococcus Toxins and Antitoxins. VI. A Strain of Hemolytic Streptococcus of High Toxicogenicity—
Leo Rane and Louise Wyman
Proceedings of the Society for Experimental Biology and Medicine, 36: 690–692, June, 1937.

Diphtheria Toxin. I. Isolation and Characterization of a Toxic Protein from Corynebacterium Diphtheria Filtrates—
Alwin M. Pappenheimer, Jr.
Journal of Biological Chemistry, 120: 543–553, September, 1937.

Studies in Diphtheria Toxin Production. III: A Simple Gelatin Hydrolysate Medium and some Properties of the Toxin Produced Thereon—
A. M. Pappenheimer, Jr., and S. J. Johnson
British Journal of Experimental Pathology, 18: 239–244, June, 1937.

Division of Child Hygiene

Sixth Grade Health Awareness in Massachusetts—
Fredrika Moore, M.D., and Angeline Hamblen
Journal of Educational Research, 30: 684–693, May, 1937.

Institutes—What Do We Expect from Them—
Ann Dinegan, R.N.
Public Health Nursing, 29: 425, July, 1937.

Division of Communicable Diseases

Undulant Fever in Man, and its Relationship to Bang's Disease in Livestock—
Gaylord W. Anderson, M.D.
Journal of Milk Technology, 1: 26–29, October, 1937.

Division of Food and Drugs

The Coloring of Food: Its Use and Abuse—
Hermann C. Lythgoe
Scientific Monthly, 45: 119–125, August, 1937.

The Enforcement of the Bedding and Upholstered Furniture Laws in Massachusetts—
Hermann C. Lythgoe
Bedding Manufacturer, 34: 42–44, October, 1937.

Division of Genitoinfectious Diseases

Massachusetts Provides for the Treatment of Gonorrhea and Syphilis—
N. A. Nelson, M.D.
Venereal Disease Information, 18: 381–383, November, 1937.
Syphilis and Gonorrhea and Accident—
N. A. Nelson, M.D.
Safety Engineering, 73: June, 1937.
Syphilis Looks at the Doctor—
N. A. Nelson, M.D.
N. E. Journal of Medicine, 217: 971–976, December 16, 1937.
The Control of Congenital Syphilis in Massachusetts—
N. A. Nelson, M.D.
Bulletin of the Massachusetts Society for Social Hygiene, 7: October, 1937.
The Public Health Nurse in Control of Syphilis and Gonorrhea—
Part I. The Public Health Problem—
Gladys L. Crain, R.N.
Public Health Nursing, 29: 5–9, January, 1937.
Part II. Syphilis—Some Medical and Historical Considerations—
Gladys L. Crain, R.N.
Public Health Nursing, 29: 95–98, February, 1937.
Part III. Familial Syphilis—
Gladys L. Crain, R.N.
Public Health Nursing, 29: 160–164, March, 1937.
Part IV. Syphilis—Diagnosis and Treatment—
Gladys L. Crain, R.N.
Public Health Nursing, 29: 237–241, April, 1937.
Part V. What Do You Know About Syphilis?—
Gladys L. Crain, R.N.
Public Health Nursing, 29: 303–305, May, 1937.
Part VI. Facts About Gonorrhea—
Gladys L. Crain, R.N.
Public Health Nursing, 29: 376–381, June, 1937.
Part VII. What Do You Know About Gonorrhea?—
Gladys L. Crain, R.N.
Public Health Nursing, 29: 435–437, July, 1937.
Part VIII. A Summary of the Role of the Nurse—
Gladys L. Crain, R.N.
Public Health Nursing, 29: 475–479, August, 1937.
Creating and Maintaining the Interest of Health and Social Workers in a Program for the Control of Gonorrhea and Syphilis—
Gladys L. Crain, R.N.
Venereal Disease Information, 18: 384–391, November, 1937.

Division of Sanitary Engineering

The March Flood in Massachusetts—
A. D. Weston
Journal of New England Water Works Association, 51: 90–102, March, 1937.
Studies of the Pollution of Boston Harbor and Tributary Waters—
A. D. Weston and G. P. Edwards
Summary published in Civil Engineering, 7: 847, December, 1937.
Experiences with Chlorinating New Water Mains—
G. O. Adams and F. H. Kingsbury
Journal of New England Water Works Association, 51: 60–68, March, 1937.
Special Equipment Cross-Connections—
A. V. Harrington
Journal of New England Water Works Association, 51: 270–272, September, 1937.
Plumbing and its Relation to Public Health—
A. V. Harrington
Master Plumbers Service Bulletin, No. 1: 1–5, July 2, 1937.

Division of Tuberculosis

The Role of Contact Examinations in the Control of Tuberculosis—
Alton S. Pope, M.D.
New England Journal of Medicine, 217: 421–423, September 9, 1937.

Chronic Non-Tuberculous Basal Lung Disease in School Children—
Philip E. Sartwell, M.D.
New England Journal of Medicine, 217: 941–945, December 9, 1937.

The Incidence of Tuberculosis in Silicotics—
Alton S. Pope, M.D.
American Review of Tuberculosis, 35: 638–639, May, 1937.

Unusual Locations of Tuberculosis Lesions in the Spine—
Z. B. Adams, M.D., and John J. Decker, M.D.
Journal of Bone and Joint Surgery, 19: 719–724, July, 1937.

The Relief of Pain in Cancer Patients—
Ernest M. Daland, M.D.
Supplement No. 121 to the Public Health Reports, December, 1936.

The Bladder Complications of Carcinoma of the Cervix—
Roger C. Graves, M.D., Charles J. E. Kickham, M.D. and Ira T. Nathanson, M.D.
Surgery, Gynecology and Obstetrics, 63: 785–793, December, 1936.

The Ureteral and Renal Complications of Carcinoma of the Cervix—
Roger C. Graves, M.D., Charles J. E. Kickham, M.D. and Ira T. Nathanson, M.D.
The Journal of Urology, 36: 618–640, December, 1936.

Cavernous Hemangiomata of Small and Large Bowel—
Lauren V. Ackerman, M.D.
The American Journal of Cancer, 30: 753–757, August, 1937.

The Urological Complications of Carcinoma of the Cervix—
Roger C. Graves, M.D., and Charles J. E. Kickham, M.D.
The American Journal of Surgery, 38: 168–172, October, 1937.

Cancer of the Cervix Treated by the Roentgen Ray and Radium—
Joe Vincent Meigs, M.D., and Richard Dresser, M.D.
Annals of Surgery, 106: 653–667, October, 1937.

Life Expectancy and Incidence of Malignant Disease. II Carcinoma of Lip, Oral Cavity, Larynx and Antrum—
Claude E. Welch, M.D., and Ira T. Nathanson, M.D.
The American Journal of Cancer, 31: October, 1937.

Department of Public Health

Appropriation and Expenditures for Year Ended November 30, 1937

	Appropriation and Amounts Brought Forward	Expenditures to November 30, 1937
Division of Administration	$37,955.00	$36,829.31
Division of Adult Hygiene	97,502.00	93,321.84
Division of Child and Maternal Hygiene	91,282.06	88,846.17
Division of Communicable Diseases	92,622.13	88,655.84
Treatment of Gonorrhea and Syphilis	50,000.00	42,061.16
Division of Genitoinfectious Diseases	42,365.76	38,283.26
Division of Food and Drugs	75,229.18	74,498.53
Administration Shellfish Law	3,090.00	3,090.00
Division of Biologic Laboratories:		
Antitoxin and Vaccine	116,813.62	111,762.91
Wassermann Laboratory	24,715.03	24,538.47
Division of Water Supply and Sewage Disposal	157,878.51	156,922.61
Sanitary Condition of Certain Rivers	9,056.17	7,505.24
Division of Tuberculosis	44,195.33	43,605.01
Subsidies to Cities and Towns	456,000.00	455,993.33
Tuberculosis Clinic Units	47,408.85	47,150.10
Chronic Rheumatism Hospitalization	9,000.00	4,614.05
	$1,355,113.64	$1,317,677.83

Receipts for Year ended November 30, 1937

Licenses, etc.	$8,300.51

State Sanatoria and Pondville Hospital

Appropriations and Expenditures for the Year ending November 30, 1937

	Appropriations and Balances	Expenditures	Receipts
Lakeville State Sanatorium	$348,845.49	$341,649.33	$149,405.82
North Reading State Sanatorium	288,979.69	271,526.23	80,235.95
Rutland State Sanatorium	379,380.84	363,237.87	160,421.06
Westfield State Sanatorium	300,625.22	283,974.08	57,835.94
Pondville Hospital	362,548.68	343,220.58	83,093.77

Special Appropriations

	Appropriation and Balances	Expenditures
Lakeville		
Chapter 234, 1937, Item 627 Fire Protection and Sprinklers	$2,974.26	$1,941.71
Chapter 304, 1936, Item 594 Improvements to Water Supply	1,492.62	604.44
Chapter 304, 1936, Item 595 Occupational Therapy Shop, Construction and Equipment	556.48	433.90
Chapter 234, 1937, Item 627a Improvement to Sewage Disposal	4,150.00	18.90
North Reading		
Chapter 234, 1937, Item 629 Fire Protection and Sprinklers	3,503.45	1,292.98
Chapter 304, 1936, Item 598 Addition to Storehouse	4,819.21	4,819.21
Chapter 304, 1936, Item 599 Enlarging Employees' Dining Room	2,000.00	2,000.00
Chapter 234, 1937, Item 630 Improvement to Water Supply	450.00	340.59
Chapter 234, 1937, Item 631 Improvement to Sewage Disposal	1,400.00	1,136.72
Rutland		
Chapter 234, 1937, Item 634 Installation of Hydrants and Improvement to Water Supply	1,530.00	1,001.18
Westfield		
P.W.A. Docket 1155, Mass. State Project H-102 Tuberculosis and Cancer Group	499,438.49	380,715.31
Chapter 304, 1936, Item 604 Fire Protection and Sprinklers	2,002.53	906.00
Chapter 234, 1937, Item 636 Improvement to Water Supply	24,657.72	4,674.74
Chapter 234, 1937, Item 637 Enlarging Sewage System	6,484.91	5,514.32
Chapter 234, 1937, Item 637a Remodelling old administration building and furnishings	4,600.00	442.60
Chapter 234, 1937, Item 637b Furnishings and Equipment for New Buildings	135,000.00	67,273.60
Chapter 434, 1937, Item 637c Cancer and Adult Tuberculosis Service	37,300.00	6,293.19
Pondville		
P.W.A. Docket 4476, Mass. State Project H-5	1,834.75	1,690.69
Chapter 304, 1936, Item 607 Improvement to Water Supply	237.12	25.80
Chapter 304, 1936, Item 606a Service Building Renovations	829.47	370.25
Chapter 234, 1937, Item 639 Improvements to Sewage Disposal	3,564.58	3,177.73
Chapter 234, 1937, Item 640 Roads and Parking Spaces	8,700.00	7,422.40
P.W.A. Docket 4200, Mass. State Project H-6	762.53	762.53

Financial Statement Verified.
Approved.

GEO. E. MURPHY,
Comptroller.

VIII. Legislation

The Department is submitting the following proposed legislation:

1. With Reference to the Control of Diseases Dangerous to the Public Health

A study of the laws relating to public health shows that several changes should be made in chapters 71, 76 and 111 of the General Laws, as appearing in the Tercentenary Edition. No general revision has been made in recent years. New statutes have been passed from time to time with the result that there are duplications, and some requirements, in the light of our present knowledge, are no longer necessary. The amendments proposed tend to clarify the phraseology in some sections. Deletions have been made in others to avoid duplications or to eliminate requirements that have become obsolete. The term "diseases dangerous to the public health" has been substituted for infectious or communicable diseases or the name of specific diseases wherever found, in the interest of uniformity. Present isolation and quarantine regulations differ widely in various communities. This lack of standard procedures results in confusion, especially where differences exist in adjoining communities. Communicable diseases are so frequently intertown problems that more uniform control practices are desirable. Massachusetts is the only state that does not provide for state-wide isolation and quarantine measures. It is therefore recommended that the Department of Public Health be granted the authority to promulgate such minimum rules and regulations for the control and prevention of communicable diseases as it deems necessary for the protection of the public. Such rules should include not only provisions for isolation and quarantine of infected persons and their contacts, but should also include regulations as to burial following death from communicable disease, a matter in which hardship and even cruelty are often inflicted due to unnecessary restrictions.

2. Relative to Protecting Public Water Supplies

The General Laws as now written authorize the city or town to establish boards of water commissioners, to extend their water supply systems, borrow money for certain purposes and in fact carry out the various functions relating to a municipal water supply, except that they are not authorized to develop the source of supply. It would seem that every municipality should be authorized to develop a source of water supply within their limits not already appropriated for the purposes of a public water supply, subject to the approval of the Department of Public Health. The proposed legislation is necessary under the circumstances.

3. Relative to Requiring a City or Town or Water Company to Make Such Improvements Relative to an Existing Water Supply as in the Judgment of the Department of Public Health May Be Necessary for the Protection of the Public Health

In certain instances the authorities of water companies and cities and towns have permitted conditions to exist in connection with their sources of water supply, which in the opinion of the Department of Public Health are a menace to the protection of the public health. In cases where the water supply is a result of an enabling act passed prior to the establishment of the Department, the Department has no jurisdiction in the matter except to advise. In cases where the water supply was established with the approval of the Department, the Department's only alternative is to withdraw its approval of the source of water supply. The proposed legislation should remedy this very difficult situation.

4. Relative to Licensing of Persons Who Pasteurize Milk Intended for Sale

In many instances owners of pasteurization establishments have permitted irresponsible persons to pasteurize milk, and such persons have not performed the work as provided by statute. In other instances where violations have been detected, the owner of the plant has claimed that his employee has violated instructions and the employee will not contradict this statement even if he has been

ordered by his employer to commit the violations which have been detected. A system of licensing the operator will insure a better compliance with the laws relating to the pasteurization of milk, particularly so if the operator is faced with a revocation of his license, under which conditions he is not liable to illegally pasteurize milk if so directed by his employer. This proposed legislation should not be construed as a revenue-producing measure, and, therefore, the fee has been set at a purely nominal sum.

5. Relative to the Licensing of Establishments Located Without the Commonwealth in Which Milk is Pasteurized for Sale Within the Commonwealth

Establishments pasteurizing milk in Massachusetts are now under license from local boards of health, the license subject to suspension by the Department of Public Health for violation of the regulations. There are quite a number of pasteurization establishments located without the Commonwealth, but a relatively short distance from the State border, which are pasteurizing milk for sale in Massachusetts. It is deemed advisable that such establishments should be put under license as are the establishments in Massachusetts but that the license should be issued by the Department of Public Health as is the case with out-of-state frozen dessert and carbonated beverage factories. Owing to the practical impossibility of supervising out-of-state plants pasteurizing cream for Massachusetts, it is suggested that plants pasteurizing only cream shall not be subject to license, particularly so since the law relating to milk permits (Section 43 of Chapter 94 of the General Laws, as amended) excludes cream from its provisions.

6. To Further Regulate the Conditions Under Which Food Shall be Manufactured for Sale

Local boards of health now have authority to regulate conditions under which food may be kept or exposed for sale (Section 146 of Chapter 94 of the General Laws). There are no general provisions for making regulations as to conditions under which food may be manufactured for sale and it is deemed advisable that regulations should be provided for. Food may be manufactured in one city and sold in several other cities and towns, and it is preferable that these regulations should be uniform throughout the Commonwealth.

7. To Permit the Admission to the Lakeville State Sanatorium of Persons Crippled by Certain Orthopedic Conditions

Occasionally during the past year there have been patients with osteomyelitis or other chronic crippling conditions than poliomyelitis found in our clinics for crippled children who needed prolonged hospital care. In instances where these patients were under fourteen years of age they could be sent to the Massachusetts Hospital School at Canton, but if over that age there was no State institution to which they could be sent to receive suitable care. The amendment proposed would remedy this situation. It would not mean additional construction but would permit us to utilize for these cases vacant beds at the Lakeville State Sanatorium.

Respectfully submitted,

Henry D. Chadwick,
Commissioner of Public Health.

Approved and adopted, January 18, 1938

Charles F. Lynch
George D. Dalton
Richard M. Smith
Francis H. Lally
Richard P. Strong
James L. Tighe
Public Health Council

REPORT OF THE DIVISION OF ADMINISTRATION SERVICES FOR CRIPPLED CHILDREN

EDWARD G. HUBER, M.D., *Director of Orthopedic Unit*

The Division of Administration has conducted the program of Services for Crippled Children in accordance with the original plan in all essential details. There has been an increase in the personnel engaged in this work, not so much because of the growing number of children served by the clinics but because all these children require long continued treatment. Most of the patients admitted to the early clinics are still under constant supervision and care.

CLINICS

During 1937 a monthly clinic was held in each one of the following ten cities:

Brockton	Lowell
Fall River	Pittsfield
Gardner	Salem
Haverhill	Springfield
Hyannis	Worcester

In addition, clinics were held at Greenfield until May 31 when that clinic was discontinued because its accomplishments did not compare sufficiently favorably with the others to warrant its continuance.

The ten clinics are being conducted by the same orthopedic consultants who took original charge of the diagnostic and clinical work with one exception. Since February Dr. Albert H. Brewster has been in charge of the Lowell Clinic, he having been appointed after nomination by the Technical Advisory Committee and acceptance by the Middlesex North District Medical Society. The consultants and their respective clinics are given in the table below:

Consultant	*City*	*Consultant*	*City*
Dr. George W. VanGorder,	Brockton	Dr. Albert H. Brewster,	Lowell
Dr. Eugene A. McCarthy,	Fall River	Dr. Francis A. Slowick,	Pittsfield
Dr. Mark H. Rogers,	Gardner	Dr. Harold C. Bean,	Salem
Dr. Arthur T. Legg,	Haverhill	Dr. Garry deN. Hough, Jr.,	Springfield
Dr. Paul L. Norton,	Hyannis	Dr. John W. O'Meara,	Worcester

Clinics are being held in the following named hospitals. There has been no change in this respect except in Haverhill where the clinic was changed from the Gale Hospital to the Hale Hospital because the former was closed down.

Name of City	*Name of Hospital*	*Name of City*	*Name of Hospital*
Brockton	Brockton Hospital	Lowell	St. John's Hospital
Fall River	Union Hospital	Pittsfield	St. Luke's Hospital
Gardner	Henry Heywood Memorial Hospital	Salem	Salem Hospital
Haverhill	Hale Hospital	Springfield	Wesson Memorial Hospital
Hyannis	Cape Cod Hospital	Worcester	Worcester City Hospital

PATIENTS

During 1936 there were 253 visits to clinic by 215 children. Of these, 23 were discharged for one reason or another, chiefly because nothing more could be done for them. The other 192 children were continued under care. During 1937 there were 485 new cases and 1,423 clinic visits. The clinics were attended as follows during 1937:

City	*Clinic Visits*	*New Cases*	*City*	*Clinic Visits*	*New Cases*
Brockton	139	46	Lowell	121	31
Fall River	142	37	Pittsfield	95	32
Gardner	124	48	Salem	186	59
Haverhill	86	36	Springfield	168	65
Hyannis	189	42	Worcester	137	71

Greenfield: 5 clinics—36 clinic visits—18 new cases

There have been 700 children admitted to clinics since the first clinic was held at Pittsfield in September, 1936. The crippling conditions for which these children were admitted have been classified as follows:

Crippling Condition	*No. of Cases*
Congenital absence of hand	3
Congenital absence of hand and arm	2
Congenital absence of hand and leg	1
Congenital torticollis	14
Congenital clubfoot	20
Congenital clubhand	3
Congenital deformity of chest	1
Congenital deformity of hip	2
Congenital deformity of leg and arm	1
Congenital deformity of elbow	1
Congenital deformity of leg	4
Congenital deformity of hand	4
Congenital deformity of shoulder	2
Congenital dislocation of hip	15
Congenital dislocation of patella	1
Birthmark on face	1
Spina bifida	8
Cleft palate and hare lip	6
Cleft palate	17
Hare lip	2
Defective closure of lips	1
Epispadias	1
Absence of rectum	1
Ptosis of eyelids	3
Malformed ear	1
Birth injury, central nervous system	12
Peripheral nerve, Erb's palsy	1
Congenital hemihypertrophy	1
Strabismus	9
Osteomyelitis, acute	4
Osteomyelitis, chronic	11
Tuberculosis of spine	11
Tuberculosis of hip	10
Tuberculosis of knee	1
Cystic rib	1
Tuberculosis of foot	1
Tuberculosis of ankle	1
Arthritis, hyperthropic	1
Still's disease	2
Arthritis, infectious	8
Arthritis, traumatic	1
Acute anterior poliomyelitis	29
Heredosyphilis	1
Septic hip	5
Infectious lesion, hip	1
Legg's disease	5
Rheumatic fever	4
Post-traumatic deformity of hip	3
Post-traumatic deformity of ankle	1
Post-traumatic cataract	1
Post-traumatic strabismus	1
Post-traumatic deformity of feet	9
Post-traumatic deformity of hand	4
Post-traumatic deformity of wrist	1
Post-traumatic deformity of finger	1
Post-traumatic deformity of knee	2

Crippling Condition	*No. of Cases*
Amputation of legs	3
Deformity due to burn	5
Post-traumatic torticollis	1
Fractured collar bone	1
Brachial plexus injury	1
Deformity due to old fracture	2
Loss of eye	1
Sprain, back	1
Contraction of gastrocnemius	1
Spastic paralysis	93
Postpoliomyelitic conditions	165
Slipped epiphysis of the femur	2
Obstetrical paralysis	50
Transverse myelitis	1
Flexion contraction of knees	1
Postrachitic conditions	11
Cystic growth on knee	1
Rachitic coxa vara	1
Plantar wart	1
Bone tumor	1
Multiple exosticus	2
Lesions, lupus pernio group	1
Cavernous hemangioma	1
Esophagus stricture	1
Scoliosis	52
Progressive muscular dystrophy	8
Postural flatfoot	23
Faulty posture	9
Speech defect	3
Spondylolisthesis	1
Osgood's-Schlatters' disease	2
Bow legs	8
Congenital coxa vara	1
Diagnosis deferred	11

Treatment

There were 184 admissions to hospitals as follows:

Name of Hospital and City	*No. of Admissions*	*Name of Hospital and City*	*No. of Admissions*
Cambridge Hospital, Cambridge	6	St. Luke's Hospital, Pittsfield	22
Children's Hospital, Boston	6	St. Vincent's Hospital, Worcester	1
Heywood Memorial Hospital, Gardner	11	Union Hospital, Fall River	12
Massachusetts General Hospital, Boston	32	Wesson Memorial Hospital, Springfield	14
Salem Hospital, Salem	16	Worcester City Hospital, Worcester	17
Springfield Hospital, Springfield	4	Worcester Memorial Hospital, Worcester	2
St. John's Hospital, Lowell	14	Lakeville State Sanatorium, Middleboro	27

These patients have been in hospital a total of 7,303 days. A total of 142 operations have been performed, classified as follows:

Repair to cleft palate
Plastic to hare lip
Plastic (skin grafting)
Hoke arthrodesis
Plantar fasciotomy
Transplantation of tensor and sartorius to patella
Myotomy
Sternomastoid myotomy
Sever operation
Intertrochanteric osteotomy
Subtrochanteric osteotomy
Osteotomy of tibia and femur
Shelf operation (hip)
Wrist fusion
Transplantation of wrist flexors, and extensors
Resection of obturator nerves
Transplantation arthrodesis
Bilateral Souther fasciotomy

Ether manipulation
Hip fusion
Reduction of hip
Hess' operation
Ober operation
Division of pectoralis and subscapularis
Lengthening of tendo Achilles
Tenotomy
Posterior bone block
Stabilization (foot)
Pan arthrodesis
Reconstruction operation (foot)
Subastragaloid arthrodesis
Aspiration of knee
Resection of ulna and osteotomy to radius
Transplantation of biceps and triceps to acromion
Resection of ilium
Traction of leg
Clubfoot operation
Steindler stripping
Medial dissection
Tibial neurotomy
Incision and drainage
Excision of cyst, kneejoint
Excision of proximal fragment of carpal scaphoid

In addition, 15 were admitted to hospital for study, 17 were admitted for application of cast or brace adjustment, and 10 were discharged without operation.

During 1937, 2,804 physiotherapy treatments were given the patients examined at clinics for whom such treatment was prescribed. There were 192 such cases; each one has received an average of 15 treatments either in the patient's own home or in some central place where several patients gathered by appointment.

Braces or other apparatus were provided for 129 patients at a total cost of $2,091.45 during 1937.

Field Staff

Dr. Paul Wakefield has continued to act as Supervisor of Clinics for Crippled Children. At the beginning of the year he was assisted by four physiotherapists, one in each of the four districts into which the State was arbitrarily divided for convenience of administration of the clinics. Two of the original four physiotherapists are still on duty. The other two have been replaced, and two additional ones employed. This has resulted in a change in the geographic boundaries of the districts, which now are as follows:

District	*Clinic*	*Physiotherapist in Charge*
1. Western: Berkshire, Franklin Hampden and Hampshire Counties	Pittsfield Springfield	Miss Evelyn A. Cronin
2. Central: Worcester County	Worcester Gardner	Miss Elizabeth R. Savage
3. Northeastern: Essex and Middlesex Counties	Salem Haverhill Lowell	Miss Dorothy Strogoff Miss Marjorie Foster
4. Norfolk, northern parts of Bristol and Plymouth Counties, southern part of Worcester County	Brockton	Miss Helen Anderson
5. Southeastern: Barnstable County, southern parts of Bristol and Plymouth Counties	Fall River Hyannis	Miss Hilda S. Teitelbaum

For the greater part of 1937 there was only one medical social worker on the staff of Services for Crippled Children. She was assigned to the southeastern part of the State where she divided her time between Services for Crippled Children and the Lakeville State Sanatorium. In the other three sections of the State three medical social workers employed by the Division of Tuberculosis gave a part of their time to Services for Crippled Children. On November 1, a second medical social worker joined the unit. During the early months of 1938 there will be a reorganization of medical social work. Two workers now on duty are Miss Christina I. Moir and Miss Marguerite Eisenmann.

Lakeville State Sanatorium

The staff at the Lakeville State Sanatorium is augmented by three employees paid from the federal grant for Services for Crippled Children. They are: a supervising physiotherapist, a physiotherapist, and a mechanical handy man (bracemaker).

Central Office Staff

During 1937 the office staff was increased considerably. At the beginning of the year, besides the Assistant Director of Public Health Administration (who is paid from the United States Public Health Service Federal Grant) there were only a senior and a junior clerk and stenographer. There have been added a statistical clerk, a bookkeeper (who is paid from the United States Public Health Service Federal Grant since she keeps the accounts of all federal grants) and another senior clerk and stenographer. The personnel now consists of the following:

Mrs. Hilda Goren, senior clerk and stenographer—in charge of office.
Mrs. Barbara Tower, senior clerk and stenographer—bookkeeper.
Miss Anna Dacey, senior clerk and stenographer—statistical clerk.
Miss Bessie Shack, senior clerk and stenographer—social service.
Miss Rita Doherty, junior clerk and stenographer—bookkeeping assistant.

Budget

During 1937 there was received from the Children's Bureau, Department of Labor, Washington, D. C. the sum of $87,398.77. The expenditures totaled $72,174.74.

These expenditures were made as follows:

Salary of field staff	$27,233.08
Travel of staff	9,315.36
Salary of Lakeville State Sanatorium staff	4,433.41
Salary of office force	1,488.66
Hospital care	16,132.03
Convalescent care	8,840.13
Office Supplies and Equipment	963.15
Scientific supplies and equipment, x-rays	1,289.22
Appliances (braces, casts, etc.)	2,091.45
Miscellaneous	388.25
Total	$72,174.74

Co-operation With Department of Public Welfare

Miss Margaret MacDonald, Supervisor, Social Service for Crippled Children of the Department of Public Welfare, with her records of about 6,000 crippled children, has maintained her office across the hall from the record office of Services for Crippled Children and has co-operated to the fullest extent. This relationship has proved to be of the utmost value.

Publicity

No systematic publicity has been deemed necessary or advisable. A monthly schedule of clinics appears in the New England Journal of Medicine. Each six months a schedule of clinics for the ensuing six months is sent to each physician in the State except those in the metropolitan area and in Worcester. Occasional talks are given to luncheon clubs, women's clubs, and similar organizations.

Publications

"What Massachusetts is Doing for the Crippled Child"—A Health Message Broadcast given by Edward G. Huber, M.D., Thursday, January 28, 1937 and sponsored by the Public Educational Committee of the Massachusetts Medical Society and the Massachusetts Department of Public Health. New England Journal of Medicine, Vol. 216, No. 6, p. 258-60, Feb. 11, 1937.

"Services for Crippled Children in Massachusetts," Edward G. Huber, M.D. The Physiotherapy Review, Vol. 17, No. 4, July-Aug., 1937.

ANNUAL REPORT OF THE DIVISION OF ADULT HYGIENE FOR 1937

Herbert L. Lombard, M.D., *Director*

The loss to cancer work in the death of Dr. Robert B. Greenough on February 16, 1937, cannot be overestimated. A member of the Cancer Advisory Committee from its inception, Dr. Greenough exerted a decisive influence on the development of the program as it is today. In a paper presented in Boston in June 1930, Dr. Bigelow said of Dr. Greenough in this connection, "From the beginning Dr. Robert B. Greenough, now President of the Massachusetts Medical Society, has given more time and thought to this cancer matter than any other member of the medical profession in Massachusetts. Although Sodom and Gomorrah, I believe, would have been saved by two, any state may be saved from the disgrace of complete indifference to the cry of cancer by one such man!" That this tribute was a modest one was evidenced by his increasing and unwavering interest in the Massachusetts Cancer Program as long as he lived. The Cooperative Cancer Control Program was of intense interest to him, and was presented by him to various professional groups throughout the United States. He repeatedly said that he felt that this thorough and penetrating approach to the problem of cancer education, even though it entailed endless labor and an enthusiastic personnel, must be the ultimate method employed generally if sound results were to be expected in this field of cancer control.

The immeasurable loss of Dr. Greenough's friendship and guidance to the members of the Division of Adult Hygiene is felt by them increasingly with the passage of time.

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To facilitate understanding of the complexities of this Division, the report for 1937 will be presented topically as follows:

A. Outstanding Accomplishments
B. Epidemiology and Biometrics
   1. Biometric Research
   2. Study on Cancer Mortality
   3. Study on Cancer Morbidity
   4. Study on Cancer Cases in Massachusetts Hospitals
   5. Study on Hereditary Aspects of Cancer
   6. Statistical Presentation of Diabetes in Massachusetts through 1936
   7. Studies on Arthritis
   8. Survey of Physicians by Personal Interviews
   9. Training of Selected and Duly Qualified Personnel in Biometry
   10. Epidemiological Adaptation of Cancer Hospital Records
   11. Epidemiological Consultation on Research Papers of Pondville Physicians
   12. Supervision of Statistical Methods at Pondville
   13. Punching and Tabulating of Data for Other Divisions
C. Cancer Clinics
   1. Regular State-Aided Cancer Clinics
   2. Teaching Clinics
   3. Tenth Anniversary Celebration of the Worcester Cancer Clinic
   4. Tenth Anniversary Celebration of the Pondville Cancer Clinic
   5. Tenth Anniversary Celebration of the Lynn Cancer Clinic
D. Social Service
E. Tumor Diagnosis Service
   1. General Report
   2. Tables
F. Regular Contacts With Physicians
   1. Monthly Cancer Bulletin
   2. Periodic Appraisal of Cancer Program
   3. Immediate Response to Request for Cancer Talks
G. Public Health Committees of the Massachusetts Medical Society
H. Book Reviews for the New England Journal of Medicine

I. Cooperative Cancer Control Program
1. The Cooperative Cancer Control Committees
2. Table of Organization in 1937
3. Follow-Up Work
4. Contacts with Physicians in Connection with Cooperative Cancer Control Committees

J. Cancer Week

K. Radio
1. Massachusetts Medical Society Broadcasts
2. Health Forum
3. Special Broadcasts

L. Newspapers
1. Health Forum
2. Publicity in Connection with Cooperative Cancer Control Committees

M. Addresses on Adult Hygiene and Cancer

N. Distribution of Literature and Mail
1. Literature
2. Mail

O. Consultative Appointment of Director and Consultations of Importance
1. Appointment of Director as Consultant on Cancer to United States Public Health Service
2. Consultations Concerning Cancer Programs
3. Consultation with Several Foreign Students from Yale School of Public Health
4. Consultation with Worcester Committee for Appendicitis Control

P. Addresses of Scientific Nature
1. Epidemiological Society
2. Millbank Foundation
3. American Public Health Association
a. A State Cancer Program
b. Accuracy of the Cancer Death Records

Q. Other Important Addresses
1. Connecticut Public Health Association
2. Greenwich, Connecticut, Field Day

R. Addresses to Students in Various Institutions of Higher Learning

S. Diabetes Number of "The Commonhealth"

T. Women's Field Army

U. American Public Health Association Meeting

V. Published Papers

W. Preparation of Historical Paper

X. Resignation of Dr. Mary R. Lakeman

Y. Statistics of the State-Aided Cancer Clinics

A. Outstanding Accomplishments

A stationary crude cancer death rate; a continuation of the decrease in delay between first recognizable symptoms and visit to physician first noted in 1936; a larger percentage of individuals going to their physicians in the first month of the disease; a far greater use of the Tumor Diagnosis Service; more individuals with cancer coming to the clinics than ever before; more teaching clinics than ever before; an extension of the Cooperative Cancer Control Committees into 126 new communities, an increase over the preceding year's work by 57 communities; and the opening of two new cancer clinics—were the principal measures of achievement of the Division of Adult Hygiene for 1937. These will be discussed in detail under the respective divisions of the report.

For many years the crude death rate from cancer has been increasing. This is due in part to improved diagnoses, in part to an aging of the population, and in

part, possibly, to other non-ascertained causes. In the last few years, however, this rate is becoming stationary. When the females alone are considered and when the effect of the aging of the population is partially removed by considering the age group between twenty to sixty, there has been in 1935 and 1936 a decided drop in the rate. The 1937 figures are not yet available, but from the crude rate it is felt that there may be an even greater improvement in this age specific rate.

The delay between the first recognizable symptoms of the disease and the time when the patient presents himself to a physician is one measure of the effectiveness of public education in cancer. While it is impossible to obtain such a figure from all individuals with cancer, it is believed that the sample obtained at the Massachusetts State-aided cancer clinics is sufficiently representative to warrant a more or less general statement. Between 1927 and 1935 this period of delay fluctuated in the neighborhood of 6.0 months—the highest figure being 6.5 months and the lowest 6.0 months. In 1936 it dropped to 5.0 months and has held this rate through 1937. Five months is too long a period for an individual with cancer to delay before consulting a physician, but it is a decided improvement over six and a fraction months.

Another estimate of a similar nature is the percentage of individuals who go to their physicians within the first month of recognizable symptoms. In 1933 this percentage was 12.4. In 1937 it had risen to 18.5, the highest figure since the inception of the Massachusetts Cancer Program.

More and more the physicians of Massachusetts are taking the lead in referring patients to the cancer clinics. In the early days of the movement many patients came to the clinics because of newspaper publicity, and the percentage referred by physicians was relatively small. In the first year of the clinics the physicians referred 44.8 per cent of all cancer patients attending the clinics. In 1937 this figure increased to 86.3 per cent.

The total individuals with cancer attending the clinics has steadily increased. In the first year there were 302; in 1937 there were 1,319. The total attendance at the cancer clinics in 1937, including new and old cancer patients as well as non-cancer patients, was 12,454. Of the new patients, about one-third had cancer. Of the old patients, a much larger percentage had cancer. Many of the visits of the old patients were repeat visits of the same individuals.

Of the group of 302 cancer patients who came in 1927, 24.5 per cent were alive ten years after coming to the clinic. This does not necessarily mean that all of them were cured cases. Some of them were not, but it is felt that years of longevity may well be a measure of success in a cancer program.

Teaching clinics were not instituted until 1933. Their numbers have rapidly increased from two in the first year to sixty-nine in the last. The attendance of physicians at these clinics numbered 75 in the first year and 1,384 in 1937—a great increase.

Another method of measuring the influence of the Cooperative Cancer Control Committees is found in the use made of the Tumor Diagnosis Service by physicians living in communities that have been organized contrasted with those living in communities that have not been organized. In 1935, 4.6 per cent of the total number of physicians in the communities that have been organized prior to January 1, 1938, sent specimens to the Tumor Diagnosis Service. From the same communities in 1937, 13.9 per cent of the physicians made use of this service. Similar figures from the non-organized communities increased from 3.2 per cent to 6.8 per cent. It should also be pointed out that in some of the organized communities, pathological services have been set up, which would make this figure even more important. Furthermore, in 1935, some of the communities were organized and others were not organized until late in 1937. This again strengthens the importance of the difference between 4.6 per cent and 13.9 per cent.

All these figures indicate that the present program is gradually accomplishing its end. The combined efforts of the medical profession and the public are being felt and cancer control today seems nearer than ever before.

TABLE I.—*Outstanding Accomplishments*

	1927	1933	1934	1935	1936	1937
Cancer death rate per 100,000 population	132.0	148.1	154.1	149.0	155.0	155.6
Female cancer death rate per 100,000 population age group 20–60	118.8	115.2	120.9	111.0	111.7	
Median delay in months of patients with cancer between first symptoms and visit to physician	6.0	6.1	6.2	6.1	5.0	5.0
Percentage of patients with cancer going within one month of first symptoms to physician		12.4	15.9	18.1	15.5	18.5
Percentage of patients with cancer attending cancer clinics referred by physicians	44.8	68.3	70.5	74.0	79.9	86.3
Total individuals with cancer attending cancer clinics	302	1,015	1,047	1,042	1,262	1,319
Percentage of patients with cancer alive ten years after attending cancer clinics						24.5
Number of teaching clinics	0	2	6	16	42	69
Total number of physicians attending teaching clinics		75	190	422	843	1,384
Percentage of physicians sending pathological specimens from organized Cooperative Cancer Control Committee communities				4.6		13.9
Percentage of physicians sending pathological specimens from non-organized Cooperative Cancer Control Committee communities				3.2		6.8

B. EPIDEMIOLOGY AND BIOMETRICS

Epidemiology and biometrics comprise an integral part of the activities of the Division. It is in this section that data regarding cancer and other chronic diseases are collected, tabulated, and analyzed. The facilities for care and treatment are studied, the activities of the cancer clinics are appraised, and the effects of educational programs are determined. The various epidemiological aspects of chronic disease are studied with the view of furnishing additional information on etiology.

1. Biometric Research—Data for research are obtained from the death records, hospital records, clinic records, questionnaires to physicians, and house-to-house visits. This material is transferred to punch cards and tabulated, and later subjected to critical analysis.

2. Study on Cancer Mortality—A study of one third of the individuals who died of cancer in Massachusetts in 1932, to elicit the accuracy of cancer death records, was made by Miss Eleanor J. Macdonald at the suggestion of Dr. Robert B. Greenough. The report was presented at the meeting of the American Public Health Association in New York. The data were collected by visits to the homes of the individuals who had died of cancer, to all the physicians who had seen them, and to the hospitals they had attended. By combining the information it was possible to estimate how many of the records certified as cancer were not cancer and how many of the records certified as a particular type of cancer were inaccurate. A study of the autopsy records at one of the larger Boston hospitals showing the comparison between clinical and autopsy diagnoses furnished an estimate of missed cases. This paper has furnished the first clear-cut indication of the amount of dependence that can be placed on the mortality records in Massachusetts, and the high degree of accuracy found is a testimonial to the efficiency of the State Registrar of Vital Statistics and the physicians of Massachusetts.

3. Study on Cancer Morbidity—For the past five years biometric research has been conducted to determine what, if any, environmental factors are associated with cancer. Records were obtained from cancer patients at the Pondville Hospital and from a control group by home visits. Age and sex were matched between those having cancer and their respective controls. The cancer cases were further subdivided by location of the disease. The percentage with a given environmental variable among the cancers of the cervix, for example, was compared with the percentage of the same variable among the matched controls and the difference subjected to formula to determine whether or not it was significant. The mere

fact of significance, however, did not warrant a statement that the given variable was a causative factor in cancer as in many instances the interrelationship between variables caused all to show association with cancer while, in fact, some of them did so merely because of this. Not only the variables themselves have to be studied, but the methodology for handling such a problem. It is anticipated that a preliminary report on this piece of research will be available within the coming year.

4. *Study on Cancer Cases in Massachusetts Hospitals*—Since the inception of the Massachusetts Cancer Program the cancer records of approximately eighty general and cancer hospitals have been studied at five-year intervals. During the present year the third such study has been made using the cancer admissions to hospitals in 1935. The data comprised the age, sex and nativity of the individual, the duration of stay in hospital, duration of the disease before entering hospital, methods of diagnosis and treatment, and disposition. A part of these data is still being studied. That pertaining to the increase of hospitalization in Massachusetts was reported by Dr. Chadwick at the meeting of the American Public Health Association. In the ten-year period, the cancer deaths in Massachusetts increased 25 per cent while the increase in hospitalization for cancer in Massachusetts was over 80 per cent. The data applicable to Middlesex and Essex Counties were used to help determine the need for a cancer hospital in this locality.

5. *Study on Hereditary Aspects of Cancer*—The question most frequently asked in public meeting is, "Is a person whose father or mother died of cancer apt to have the disease?" Many reports have come from various laboratories within the past few years, some of which point strongly toward a genetic influence. Inasmuch as all these experiments have been based on animals inbred for generations and inasmuch as such intensive inbreeding is not practiced by the human race, it was thought advisable to determine by biometric research as nearly as possible the effect of cancer history on humans. Eleven communities in this State were chosen in which families had remained in the same towns for several generations. It was possible to build up a large number of family trees, more or less complete. In some cases, six generations were available. The chance of dying with cancer at each age level and at each period of time between 1841 and 1932 was computed and the sum of the expecteds compared with the actuals for the ancestors of individuals having cancer and those who did not. Additional information on this subject was obtained from the cancer morbidity study in which a cancer history for parents and brothers and sisters was obtained. The results of this hereditary study will probably be available during the coming year.

6. *Statistical Presentation of Diabetes in Massachusetts through 1936*—The report on the statistical and epidemiological findings regarding diabetes which was first published in the Diabetes Number of "The Commonhealth" in the April-May-June issue of 1934 was rewritten and published by Lombard and Miner in the April-May-June issue of 1937. This paper covered the mortality rates from 1860 to 1936, the changing age incidence of the disease, and furnished information on disability, hospitalization, duration of the disease, and certain environmental factors associated with the disease.

7. *Studies on Arthritis*—Biometric research similar to that used in the cancer morbidity study has been carried on synchronously with that study. The arthritis records were obtained from the arthritis clinics in Boston and the controls were the same as collected for the cancer study, only those being used that matched the arthritis cases for age and sex.

Another study of a somewhat similar nature is being conducted by the physicians in charge of the State arthritis work at the Massachusetts General Hospital. Controls are here obtained from non-arthritis patients in the hospital and the records are being analyzed by the Division of Adult Hygiene.

8. *Survey of Physicians by Personal Interviews*—During the summer and fall of 1937 physicians in the Berkshire, Newburyport, Northampton, Fitchburg, and a part of the Lawrence clinic zones were visited to determine their reaction to the program and to obtain suggestions for its improvement. This procedure has been conducted in different clinic zones at different times and has been found to be of immense help in improving the cancer program.

9. Training of Selected and Duly Qualified Personnel in Biometry—The practice of training personnel for biometric work that has been so successful in the past has been continued. Individuals with mathematical background, most of them college graduates, who offer to volunteer their services in return for what knowledge they can obtain, work in the Division. The work they do more than compensates for the time spent in lecturing to them on biometric methods. Some of these individuals stay only a few weeks; the longest period was one year. During the past year there have been seven such workers.

10. Epidemiological Adaptation of Cancer Hospital Records—The adequate study of large numbers of hospital records is practically impossible unless the data are transcribed to punch cards so that they can be sorted and tabulated by machinery. This requires a preparation of a satisfactory code. For several years the Division has been working on such a code for the Pondville Hospital. After the completion of the first draft of this code, it was tried on some thousand cases to determine its efficiency. Certain improvements were found necessary and a revision of the code is now nearing completion.

11. Epidemiological Consultation on Research Papers of Pondville Physicians—All research papers prepared by Pondville physicians in which statistics are used are reviewed by the Division to determine the statistical soundness of the conclusions drawn.

12. Supervision of Statistical Methods at Pondville—When members of the Pondville Staff desire statistical material for papers, they inform the statistical staff of their needs. The staff, in turn, applies to the Division of Adult Hygiene to determine the best methods for obtaining the data. During the past year, the five-year cures have been collected and tabulated.

13. Punching and Tabulating of Data for Other Divisions—Punching and tabulating of data has been done during the past year for the Pneumonia Service, Crippled Children's Program, and tabulating for the Division of Genitoinfectious Diseases.

C. Cancer Clinics

1. Regular State-Aided Cancer Clinics—The State-aided cancer clinics have continued to function as group consultation clinics. The physicians of the State have shown their appreciation of the Massachusetts Cancer Program by referring an ever-increasing percentage of cancer patients to the clinics. In 1937 the percentage of cancer patients referred by physicians to the clinics was 86.3.

On January 28th a new cancer clinic was opened at Fall River and on December 22nd the cancer clinic at the Westfield State Sanatorium opened, thus bringing the number of State-aided cancer clinics to twenty-one. All these clinics furnish group diagnosis, free diagnostic x-ray service to the indigent, social follow-up, uniform records, and all but one teaching clinics. The larger clinics meet once or twice a week; the smaller ones twice a month.

The total clinic attendance for the year was 12,454; about two-thirds of these, 8,170, were return visits of old patients. The new clinic attendance, 4,284, comprised 1,393 cancer attendance and 2,891 non-cancer attendance. While the total new attendance has only been exceeded in one year, 1934, the number of individuals with cancer exceeded any previous year.

2. Teaching Clinics—During the year sixty-nine teaching clinics were held. In the first year of reorganization sixteen teaching clinics were held; in 1936 the number had increased to forty-two; and 1937 shows more than a 50 per cent increase over the preceding year.

TABLE II.—*Teaching Clinics*

CLINIC	Number Held in 1936	Number Held in 1937
Beth Israel	0	0
Boston Dispensary	0	3
Brockton	2	3
Fall River	0*	3
Fitchburg	5	8
Gardner	3	4
Gloucester	3	5
Greenfield	4	9
Hyannis	2	2
Lawrence	5	5
Lowell	1	3
Lynn	3	3
New Bedford	1	1
Newburyport	9	5
North Adams	2	5
Northampton	1	3
Pittsfield	0	1
Pondville	0	1
Springfield	0	3
Worcester	1	2
Total number held	42	69

*Clinic opened in 1937.

3. Tenth Anniversary Celebration of the Worcester Cancer Clinic.—The Worcester Cancer Clinic celebrated its tenth anniversary on February 9th. It was ushered in by much community interest and publicity. From two to four the exhibition halls were crowded with physicians, medical students, and the public. A conservative estimate placed the attendance at five hundred. The exhibit was devoted to a demonstration of the numerous procedures and the equipment used in cancer research and therapy. There were slides, biopsies, frozen sections, demonstrations of x-ray therapy and x-ray diagnoses. There were instruments for special procedure, models of cancer, rats with cancer, as well as charts and literature. After the exhibit, the teaching clinic was conducted by Dr. Shields Warren. There were forty-one physicians present. At the conclusion of the clinic Dr. Warren gave a short address which he demonstrated with slides. The evening meeting was a public meeting and was attended by over 250 individuals. The speakers were Dr. Kendall Emerson of New York, who was chairman of the cancer clinic in Worcester at the time of its inception; Mrs. Bancroft C. Wheeler of the Worcester Junior League, who represented the organization which has given financial assistance to the clinic in the form of social worker's salary; Dr. Shields Warren of Boston; Dr. Herbert L. Lombard, Massachusetts Department of Public Health; and Dr. Ernest L. Hunt of Worcester, who has been the chief of staff of the clinic during most of the period. The newspapers carried lengthy feature articles about the clinic and its program, and visitors from seven of the other State-aided cancer clinics attended the meeting.

4. Tenth Anniversary Celebration of the Pondville Cancer Clinic—On April 14th the Pondville Cancer Clinic held a teaching clinic as an anniversary of its tenth year. It was conducted by the following staff physicians: Kickham, Graves, Daland, Dresser, Jackson, Rogers, Taylor, Finland, and Meigs. There were twenty-nine patients and forty-eight visiting physicians present. The following was the special program of talks:

10:00-10:45	Cancer of the Genitourinary Tract	Drs. Graves and Kickham
10:45-11:45	Radiation Treatment of Cancer	Dr. Dresser
11:45-12:30	Cancer of the Breast	Dr. Daland
2:00- 2:30	Lymphoma	Drs. Jackson and Finland
2:30- 3:30	General Surgical Cancer	Drs. Taylor and Rogers
3:30- 4:00	Gynecological Cancer	Dr. Meigs

5. Tenth Anniversary Celebration of the Lynn Cancer Clinic—On April 29th Lynn held its tenth anniversary cancer clinic. Dr. Frank H. Lahey was the consultant. He examined and discussed the eight patients who were referred to the clinic and then, for the fifty or sixty physicians present, gave an intensely

interesting moving picture in color of a complete two-stage resection of the intestine. This clinic was followed immediately by a dinner attended by about three hundred individuals. Dr. Henry D. Chadwick, Commissioner of Public Health, talked on the cancer program as a whole. Dr. William T. Hopkins, chairman of the Lynn cancer clinic, gave a ten-year statistical account of the results of the clinic. Mrs. Oates, the social worker, gave a brief discussion of the social service aspects, and Dr. Lahey made a sincere, intensive plea for intelligent recognition of abnormal conditions.

D. Social Service

Medical social service has an important part in all of the cancer clinics. The major service continues to be helping patients to an acceptance of treatment, assistance with the arrangements for hospital care, and continued follow-up during and after treatment. In many cases, however, there are more complex social problems which are being met.

The Department supervisor of social service has continued to offer consultation service to social workers, nurses, and others, and has taken part in the programs of the schools of social work.

The supervisor has attempted to bring to the attention of the social workers significant developments in the field of social service, public health, and welfare legislation. During the year she made seventy-six visits to individual cancer clinics and tried to improve the technique of the social workers. She discussed difficult case problems with them, offered criticism, and made suggestions for better service.

E. Tumor Diagnosis Service

1. General Report—The work of the Tumor Diagnosis Service has increased 15.5 per cent this year with a total of 3,106 specimens, of which 909 were received from the Collis P. Huntington Memorial Hospital. This increase is the more remarkable since one of the hospitals that has given an appreciable degree of material, the Brockton Hospital, has developed its own pathologic service. The frequency with which hospitals establish their own pathologic service after appreciating the benefits derived from the work of the Tumor Diagnosis Service is one of the gratifying features of the program.

As in the past the bulk of the material has been derived from the smaller hospitals and from those surgeons without laboratory facilities available in their vicinity. During the past year the material came from 117 hospitals and 645 physicians. This shows a very wide appreciation of the value of the type of service rendered and emphasizes the importance of the Tumor Diagnosis Service as an integral part in the State cancer control program.

The laboratory has continued under the immediate direction of Dr. Olive Gates, with the assistance of Dr. Robert Meyer who served as interne from July 1, 1937, to the end of the year.

The study of the relation of benign lesions of the breast to the subsequent development of carcinoma has been continued and expanded.

The collection of rare tumors has been further developed and has proved of material value to graduate students and to others. An appreciable amount of material from this collection was presented to the Army Medical Museum at the request of the Curator.

The special study of skin tumors is continuing and it is hoped within the next two years to have concrete results to report.

2. Tables—A list of the hospitals and the number of surgeons, by towns, who have sent in specimens, is shown in Tables XVII and XVIII.

F. Regular Contacts With Physicians

1. Monthly Cancer Bulletin—The mailing list for the Cancer Bulletin continued to grow. One hundred and seventy-two physicians had their names added to the mailing list during the year. The Bulletin is now being sent to approximately 2,500 physicians. This list has been compiled at the request of the physicians themselves. The content of the Bulletin is varied to meet the needs of the physi-

cians who receive it. The following abstracts have appeared during the year:

"Physical Examinations and Cancer Control."

"The Relation of the Internist to the Cancer Problem."

"Precancerous Lesions of the Skin."

"Abstract of Annual Report of the Division of Adult Hygiene" (four bulletins).

"Address of Dr. William T. Hopkins, Chairman of the Lynn Cancer Clinic, at the Tenth Anniversary of the Lynn Cancer Clinic."

"Precancerous and Carcinoid Lesions of the Cervix Uteri."

"Cancer of the Breast."

"The Present Position of Treatment in Carcinoma of the Cervix Uteri."

"The Diagnosis and Treatment of Primary Cancer of the Lung."

2. Periodic Appraisal of Cancer Program—Two hundred and forty-three physicians in the Berkshire, Northampton, Newburyport, Fitchburg, and a part of the Lawrence clinic areas were seen by Dr. Medinger and questioned regarding their reactions to the program. The educational program was approved by all and the clinics and hospitalization by nearly all.

3. Immediate Response to Request for Cancer Talks—Seven hundred and forty-six physicians were personally contacted asking them to speak at the local Cooperative Cancer Control meetings. In only an occasional instance has the physician refused after the plan was explained to him. The response to this request is almost 100 per cent.

G. Public Health Committees of the Massachusetts Medical Society

The Director of the Division has served on the Committee on Public Health and the Committee on Public Education of the Massachusetts Medical Society. There have been several meetings of these committees, the principal objectives being a closer cooperation between the Massachusetts Medical Society and the Massachusetts Department of Public Health, and a better radio series sponsored by the Massachusetts Medical Society. The fifteen-minute radio talk formerly given has been abandoned and a dialogue form of presentation has been substituted. The series has been renamed "Green Lights to Health."

H. Book Reviews for the New England Journal of Medicine

The Director has prepared two book reviews for the New England Journal of Medicine.

I. Cooperative Cancer Control Program

1. The Cooperative Cancer Control Committees—The educational program for the dissemination of information concerning cancer consists of the teaching of exact knowledge by an authority in the person of the family physician to the individual as one of a small group. To accomplish this in a State of more than 350 communities, with a population of nearly four and one half million, and over 7,000 physicians, each community in the State has, or is in the process of having, a Cooperative Cancer Control Committee. The individual Cooperative Cancer Control Committees of the several communities in Massachusetts automatically become integral parts of a State-wide Cooperative Cancer Control Committee. Two hundred and sixty of the communities of the State were organized as of December 31, 1937. The committees differ from many other educational committees in that they are not selective and consequently restricted to limited groups or classes, but they are rather inclusive in nature, and represent every type of group and individual in the community—religious, political, labor, foreign, social, fraternal, patriotic, and service.

These clubs promise to have at least one meeting a year on cancer. A club does not have to have an impressive membership to become corporate in this plan. The small group of eight or twelve is an ideal size. The group, itself, determines the type of cancer talk it will have. Some prefer the round-table discussion with the physician during which questions are asked. In any case, a question period is desirable.

The local physician is the one who is asked to be the teacher in this program because the decline or increase in early detection of cancer is entirely in his hands,

because he will obtain more cooperation from his community if it knows exactly what to do and what the early symptoms are, because the local physician knows his community, and because it has always been the natural prerogative of the physician to teach.

At the end of 1937 representatives of 5,368 organizations had agreed to serve on the Cooperative Cancer Control Committees and urge their respective clubs to have annual talks on cancer by local physicians. Such figures as are available warrant the assumption that over 100,000 people were reached with cancer talks during the past year.

During the first eight years of the Massachusetts Cancer Program, the interval of delay between first recognizable symptoms on the part of the patient and consultation with first physician remained near six months. At no time did it go under 6.0 months and most of the years it varied from 6.1 to 6.5 months. The new program was started in the fall of 1934. No statistical effect was noted in 1935 but in 1936, with nearly half of the State organized, the delay dropped to 5.0 months and remained at this figure in 1937. Both the Huntington and the Palmer Memorial Hospitals have shown an increase in attendance at their out-patient clinics and the attendance of cancer patients at the State-aided cancer clinics has increased.

Another measure of the effectiveness of the Cooperative Cancer Control Committees is the finding in relation to the number of physicians who sent specimens to the Tumor Diagnosis Service. In 1935, when only a few communities had been organized, the percentage of physicians in the 260 communities now organized who used the service was 4.6. In 1937 this percentage increased to 13.9—slightly over a three-fold increase. In the communities which are not organized, the percentage of physicians who sent specimens in 1935 was 3.2 and in 1937, 6.8—slightly over a two-fold increase. This clearly indicates that communities which have been organized by the Cooperative Cancer Control Committees have a larger increase in the percentage of physicians making use of the Tumor Diagnosis Service than non-organized communities. If the fact is taken into account that some of the communities were organized in 1935 and that several of them were organized late in 1937, the real increase in the organized groups is probably greater than the figures indicate.

2. Table of Organization in 1937—

TABLE III.—*Cooperative Cancer Control Committee Organization*

COMMUNITIES Organized in 1937	Date of Organization	Number of Organizations Cooperating	Number of Contacts Made
Acushnet	Feb. 9	15	25
Alford	June 21	5	7
Ashburnham	Sept. 8	14	13
Auburn	Nov. 2	20	32
Barre	Sept. 8	29	44
Becket	July 26	7	14
Berkley	Feb. 12	7	20
Berlin	Nov. 9	14	21
Beverly	June 10	174	252
Blackstone	Dec. 9	17	27
Boylston	Oct. 26	12	23
Bridgewater	Nov. 5	46	68
Carver	Mar. 17	11	17
Charlton	Sept. 29	18	22
Cheshire	July 23	11	19
Chesterfield	Sept. 9	5	9
Chilmark	Oct. 27	6	9
Clarksburg	July 27	5	8
Clinton	Oct. 22	96	123
Cohasset	May 21	24	60
Cummington	Sept. 3	9	18
Dartmouth	Feb. 23	13	44
Dighton	Feb. 18	22	31
Douglas	Sept. 14	17	23
Dover	June 22	12	14
Dudley	Oct. 5	10	24
Duxbury	Apr. 12	21	42
East Bridgewater	Oct. 20	27	44
Easton	May 19	44	58
Edgartown	Oct. 28	22	31
Egremont	June 21	8	7
Fairhaven	Mar. 2	32	40
Fall River	Jan. 26	320	412
Florida	July 28	1	3
Foxborough	June 1	28	43
Franklin	July 1	55	78
Freetown	Feb. 24	11	24
Gay Head	Oct. 27	2	5
Goshen	Sept. 3	3	7
Halifax	Mar. 29	10	13
Hancock	July 28	2	8
Hanover	Apr. 21	20	36
Hanson	Mar. 30	18	22
Hingham	June 3	39	78
Hinsdale	July 14	11	22
Holden	Sept. 22	25	35
Hopedale	Dec. 2	23	36
Hudson	Nov. 22	52	75
Kingston	Apr. 5	21	47
Lakeville	Feb. 11	6	14
Lanesborough	July 29	9	14
Leicester	Oct. 22	29	26
Mansfield	May 10	48	75
Marion	Feb. 16	16	26
Marlborough	Oct. 20	73	117
Marshfield	Apr. 23	14	37
Mattapoisett	Feb. 10	12	18
Medfield	June 9	20	46
Mendon	Dec. 3	11	22
Middleborough	Apr. 16	90	130
Middlefield	July 20	4	12
Milford	July 6	81	108
Millbury	Nov. 3	39	55
Millis	June 15	11	29
Millville	Nov. 29	4	18
Monterey	July 16	5	12
Mount Washington	June 21	1	1
Nantucket	Nov. 3	35	53
New Ashford	July 22	1	2
New Marlborough	July 16	6	12
Norfolk	June 18	7	16
North Attleborough	June 10	53	72
Northborough	Nov. 22	20	28
Northbridge	Sept. 28	51	66
Norton	Apr. 21	20	30
Norwell	Apr. 14	13	25
Oak Bluffs	Oct. 26	22	31
Oakham	Sept. 14	8	15
Otis	July 16	6	11
Oxford	Sept. 21	26	46

TABLE III.—*Cooperative Cancer Control Committee Organization*—Continued

Communities Organized in 1937	Date of Organization	Number of Organizations Cooperating	Number of Contacts Made
Paxton	Sept. 23	14	21
Peabody	May 3	95	136
Pembroke	Apr. 15	14	32
Peru	July 14	1	8
Petersham	Sept. 20	10	23
Plainfield	July 19	4	11
Plainville	May 20	12	19
Plymouth	June 30	88	156
Plympton	Mar. 23	9	13
Provincetown	Apr. 26	37	69
Raynham	Mar. 31	10	8
Rehoboth	Mar. 16	28	41
Revere	June 8	79	124
Richmond	June 15	7	10
Rochester	Mar. 3	10	12
Rutland	Sept. 16	16	22
Salem	May 17	157	203
Sandisfield	July 16	7	9
Savoy	July 15	5	8
Scituate	May 12	38	46
Seekonk	Mar. 10	35	40
Sheffield	July 20	12	20
Shrewsbury	Oct. 27	27	45
Somerset	Mar. 22	24	50
Spencer	Sept. 14	38	63
Stockbridge	July 13	16	24
Sutton	Sept. 9	7	11
Swansea	Feb. 17	23	37
Templeton	Sept. 9	21	31
Tisbury (Vineyard Haven)	Oct. 25	26	36
Tyringham	July 15	5	11
Upton	Dec. 8	22	33
Uxbridge	Sept. 27	34	38
Wareham	Feb. 25	52	57
Washington	July 26	–*	3
Webster	Sept. 13	98	130
West Boylston	Sept. 29	18	37
West Bridgewater	Sept. 30	20	29
Westfield	Sept. 8	79	153
Westport	Mar. 15	24	43
West Stockbridge	June 14	8	14
West Tisbury	Oct. 27	5	8
Winchendon	Sept. 20	41	53
Windsor	July 12	4	10
Worthington	Sept. 10	9	14
Wrentham	June 3	18	25
Total 126 in 1937		3,462	5,280

134 Communities were organized in 1935 and 1936 with 1906 organizations cooperating, making the total for 1935, 1936 and 1937, 260 communities (or 73.2 percent of total) organized with 5,368 organizations cooperating.

		Percent of Total State
1930 Population of towns organized in 1935	921,715	22
" " " " " " 1936	519,374	12
" " " " " " 1937	643,883	15
TOTAL	2,084,972	49

*No organizations in this town.

3. Follow-Up Work—After the community is organized, it is necessary for the Division to keep in touch with the committee. Some communities need very little follow-up; others a great deal. During the past year 501 follow-up visits were made.

4. Contacts with Physicians in Connection with Cooperative Cancer Control Committees—Members of the Cooperative Cancer Control Committees and the physicians who speak are interviewed personally as well as in organization meeting. Over 90 per cent of the physicians interviewed have volunteered to speak and the Department is endeavoring to keep them supplied with the latest literature on cancer. In many cases physicians state that they do not care to make a formal

speech but will answer questions, and the records indicate that meetings of this type have been very successful.

The enthusiastic response of the profession and the public, together with an appreciable decrease in delay on the part of cancer patients before first visit to a physician warrants the assumption that the Massachusetts Cancer Program as now conducted is best meeting the needs of this State.

J. Cancer Week

The week of March 21st was designated as Cancer Week by His Excellency, Governor Charles F. Hurley. His proclamation called attention to the achievements of the Massachusetts Cancer Program now in its tenth year. Particular gratitude was expressed in the tangible means of improvement which the newer education of the last three years has brought about—that is, the notable reduction in the period of delay between the first observation of a symptom and the seeking of medical attention.

On Tuesday, March 22nd, Dr. Lila O. Burbank addressed the meeting at Malden on cancer.

On Wednesday evening, over Station W.B.Z. on March 24th, from 7:15 to 7:30, Dr. Chadwick and Dr. Lombard gave a discussion on "Cancer in Massachusetts."

On Wednesday, March 24th, from 10:30 to 10:45 P.M., over Station W.E.E.I., Dr. Chadwick and Dr. Lombard talked on "The Tenth Anniversary of the Massachusetts Cancer Program." There have been innumerable enthusiastic responses to these talks, both by letter and by word of mouth.

On Thursday, March 25th, at 4:30 in the afternoon, Dr. Joseph C. Aub gave an excellent talk on "Cancer Research" over Station W.B.Z.

On Friday, March 26th, Dr. Burbank talked over Station W.E.E.I. from 4:15 to 4:45 P.M. on "The Cooperative Cancer Control Committee Program."

An interesting program for Cancer Week, listing the activities taking place each day, was published and sent to every representative of the Cooperative Cancer Control Committees in Massachusetts, and to all the physicians in the State who had expressed a desire for the Cancer Bulletin. This program for Cancer Week was much commented upon and would undoubtedly have caused more interest if it were realized by the general public that except for the two evening radio broadcasts, it was just a record of the regular activities of the cancer program. In this State there are really fifty-two cancer weeks.

K. Radio

1. Massachusetts Medical Society Broadcasts—The Massachusetts Medical Society broadcasts are prepared by members of the Medical Society. Dr. Burbank, from the Division, acts as a secretary to the Medical Society Committee and makes the necessary arrangements with the stations. Thirty-eight broadcasts were given during the year.

2. Health Forum—Representatives of the different Divisions of the Department have continued to prepare and deliver radio talks on the activities pertaining to their respective Divisions. Dr. Burbank made the arrangements with the radio station regarding these broadcasts. Fifty-three broadcasts were given during the year.

3. Special Broadcasts—During Cancer Week two special broadcasts were given by Dr. Chadwick and Dr. Lombard. Dr. Burbank made the arrangements for the broadcast given by the State Nurses' Association.

L. Newspapers

1. Health Forum—The radio addresses prepared by members of the Department were sent to sixty-three newspapers each week. The news clips indicate that a great many of the papers printed them.

2. Publicity in Connection with Cooperative Cancer Control Committees—Prior to the organization of each community for the Cooperative Cancer Control Program, the newspapers were contacted and carried information regarding the meeting. In some communities there were several articles preceding the meeting. Following

organization there has usually been a write-up of the meeting and, later, when the local physician spoke for the program, mention has been made of this in the paper.

M. Addresses on Adult Hygiene and Cancer

A number of requests come to the Division for talks on hygiene of the adult. Thirteen such talks have been given during the year.

The Division is constantly receiving requests for talks on cancer. In communities already organized, the request is referred to the Cooperative Cancer Control Committee of that town. In unorganized communities, members of the Division discuss either the program or the disease. Twenty-two such talks have been given during the year.

N. Distribution of Literature and Mail

1. Literature—Approximately 54,000 pieces of literature have been distributed. The majority of these have been on cancer.

2. Mail—There have been approximately 8,100 pieces of incoming mail and 47,400 pieces of outgoing mail during the year.

O. Consultative Appointment of Director and Consultations of Importance

1. Appointment of Director as Consultant on Cancer to United States Public Health Service—In connection with the cancer program of the United States Government, epidemiological studies similar to those that have been done in Massachusetts are contemplated. The Director of the Division has been appointed as Consultant on Cancer to assist in this work.

2. Consultations Concerning Cancer Programs—The Director has held conferences with officials of Maine, Connecticut, and New York, and has had lengthy communications regarding the Georgia, Illinois, and Missouri programs.

3. Consultation with Several Foreign Students from Yale School of Public Health—Several foreign students from the Yale School of Public Health visited the Division to study its methods.

4. Consultation with Worcester Committee for Appendicitis Control—A committee of Worcester physicians is attempting to lower the appendicitis death rate in that city. The Director acted in an advisory capacity to this committee and offered the cooperation of the Department. The action of the Worcester group is most gratifying as the matter of appendicitis deaths was cited by the Department in its Appendicitis Week of June 12, 1933.

P. Addresses of Scientific Nature

1. Epidemiological Society—On April 23rd the Director presented a paper "Research Methods in the Epidemiology of Cancer" before the American Epidemiological Society.

2. Milbank Foundation—At the invitation of the Milbank Foundation the Director delivered a paper on "Chronic Disease at the Crossroads" on April 30th.

3. American Public Health Association—

a. A State Cancer Program—At the American Public Health Association meeting the Director collaborated with Dr. Chadwick on "A State Cancer Program."

b. Accuracy of the Cancer Death Records—On October 7th Miss Eleanor J. Macdonald presented a paper "Accuracy of the Cancer Death Records" before the American Public Health Association.

Q. Other Important Addresses

1. Connecticut Public Health Association—On May 26th the Director discussed the Massachusetts Cancer Program before the Connecticut Public Health Association.

2. Greenwich, Connecticut, Field Day—On September 15th the Director presented "The Present Status of Cancer Control" at the Field Day at Greenwich, Connecticut.

R. Addresses to Students in Various Institutions of Higher Learning

During the year the Director spoke before students at the Harvard School of Public Health, Tufts College Medical School, Tufts College Dental School, Boston University Medical School, Regis College, and the Boston School of Occupational Therapy.

S. Diabetes Number of "The Commonhealth"

The Diabetes number of "The Commonhealth" published in 1934 was very popular, both with the profession and the laity, and the issue eventually became exhausted. A second edition was prepared in 1937 in which much of the material was rewritten. The Division greatly appreciates the efforts of Dr. Joslin and his associates in helping prepare this number.

T. Women's Field Army

The Division gave considerable time during the past year to the Women's Field Army. While it was felt that the Army had little, if anything, to offer in Massachusetts, with a program as complete as possible, backed by ten years of experience, the desire to cooperate with any group attempting to improve the cancer situation motivated the time spent in executive session and in furnishing some multigraphed material for the Army.

U. American Public Health Association Meeting

Five members of the Division attended the American Public Health Association meeting in New York. One of them presented a paper, and another collaborated in one.

V. Published Papers

The following papers have been published during the year:

"Prevention of the Degenerative Diseases" by Herbert L. Lombard, M.D.

"The Historical Trend of Diabetes" by Eleanor J. Macdonald, A.B.

"Diabetes in Massachusetts" by Herbert L. Lombard, M.D., and Sally J. Miner.

"Adult Hygiene" by Herbert L. Lombard, M.D. (in press).

"Lessons from the Massachusetts Cancer Program" by Herbert L. Lombard, M.D.

"A Comparison of the Cytoplasmic Changes Induced in the Walker Rat Carcinoma 256 by Different Types and Dosages of Radiation. I. The Golgi Apparatus" by Lloyd C. Fogg, Ph.D. and Shields Warren, M.D.

"A Comparison of the Cytoplasmic Changes Induced in the Walker Rat Carcinoma 256 by Different Types and Dosages of Radiation. II. The Mitochondria" by Lloyd C. Fogg, Ph.D. and Shields Warren, M.D.

"Cutaneous Metastases of Malignant Disease" by Olive Gates, M.D.

"Cutaneous Tumors of Leukemia and Lymphoma" by Olive Gates, M.D. (in press).

"The Effect of Gamma Radiation on Mitosis" by Shields Warren, M.D.

"Pathology of Diabetes Mellitus" by Shields Warren, M.D.

"Acute Lymphocytic Meningitis" by Henry R. Viets, M.D. and Shields Warren, M.D.

"Skin Grafting as a Method of Determining the Biologic Effect of Radiation" by John Ungar, Jr., M.D. and Shields Warren, M.D.

W. Preparation of Historical Paper

Miss Eleanor J. Macdonald rewrote for the Diabetes Number of "The Commonhealth" the paper "The Historical Trend of Diabetes."

X. Resignation of Dr. Mary R. Lakeman

After twenty years of service in the Department, over half of which were spent in the Division of Adult Hygiene, Dr. Mary R. Lakeman resigned on November 30, 1937. The Division takes this opportunity to pay tribute to Dr. Lakeman on her long years of effort in behalf of public health. Dr. Lakeman was not only a zealous

worker in the Department, but has also been President of the Association of Women in Public Health, and was one of the first Fellows of the American Public Health Association. Moreover, she was a member of numerous committees affiliated with the public health field. Untiring in her effort to advance those fields in which she was most interested, Dr. Lakeman's severance from the Department will be deeply felt.

Y. Statistics of the State-Aided Cancer Clinics

Table IV. The number of individuals having cancer who attended the State-aided cancer clinics has shown a steady increase from 302 in the first year to 1,319 in the last. The crude cancer death rate for the last few years has remained practically stationary while the age specific rate for age group twenty to sixty among females has shown a decided drop. A stationary crude rate with a drop in the age specific rate among females is very encouraging inasmuch as the population of Massachusetts is growing older and with a smaller number of births the crude rate might well rise with no real increase in cancer. The drop in the age specific rate is at present limited to females but the increase in the male rate is gradually becoming less. This leads to the opinion that the peak of cancer incidence is about reached and it is doubted if a much greater rise occurs in the future aside from the effects of the changing age composition of the people.

The number of cancer cases is slightly different from the preceding report due to the fact that changed diagnoses have been incorporated in the present one.

Table V. The fallacy that individuals who have cancer must die with the disease is rapidly being relegated to the past with other superstitions. Records are now available for the number of individuals alive who have attended the cancer clinics. With approximately one quarter of all cancer cases alive ten years after coming to the clinic, and with the average symptoms of nearly a year's duration before coming to the clinic, the assumption is justified that much more is being accomplished than is realized by the general public.

Table VI. The number of individuals attending the State-aided cancer clinics in 1937 was 4,098. Cancer cases comprised 32.2 per cent of the total. One thousand three hundred and nineteen individuals were seen with cancer. These individuals had 1,413 cancers and appeared 1,393 times at clinics. The percentage of individuals with precancerous lesions was 9.2.

Table VII. The attendance at individual clinics is shown in this table as well as whether or not the patients were referred by physicians. In this table for the first time is being included the attendance of old patients at the cancer clinics. In the early years of the program, this figure was small but has risen to such an extent that its inclusion in the report is necessary.

Table VIII. The number of cities and towns from which individuals came to the cancer clinics showed a slight increase in 1937 over 1936.

Table IX. The median duration of delay between first recognizable symptoms and the first visit by the cancer patient to a physician remained the same as last year. This is encouraging as it indicates the improvement first noted in 1936 was not a mere chance phenomenon but showed a real bettering of conditions.

Table X. The percentage of cancer patients who came to the clinics referred by physicians has again increased while those referred by newspapers showed the lowest figure since the program was inaugurated.

Table XI. The distribution of cancers in individuals coming to the clinics is shown in this table.

Table XII. The contact of the cancer patients with physicians is shown in this table. This table is very satisfactory as it shows a tendency for patients to come to the clinics through their physician.

Table XIII. Cancer of the breast, buccal cavity, and skin comprised the main groups of patients who came to the clinics without consulting a physician.

Table XIV. The symptoms that first brought patients to clinics closely resembled those of previous years.

Table XV. The location of cancer, subdivided by the clinic's opinion as to prognosis, is shown in this table.

Table XVI. The diagnoses of various conditions found among the patients in the clinics are shown in this table. As some individuals had more than one condition, there were more diagnoses given than the total number of patients.

TABLE IV.—*The Massachusetts State-Aided Cancer Clinics*

	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937
Number of clinics	6	12	12	13	12	12	12	12	17	19	21
Total individuals attending clinics	1,345	2,528	2,110	2,518	3,115	3,505	3,928	4,251	3,665	3,905	4,098
Total individuals having cancer	302	540	538	653	740	889	1,015	1,047	1,042	1,262	1,319
Total individuals having precancerous lesions	111	342	284	247	298	376	512	619	378	421	378
Percentage of individuals with cancer	22.5	21.4	25.5	25.9	23.8	25.4	25.8	24.6	28.4	32.3	32.2
Percentage of individuals with precancerous lesions	8.3	13.5	13.5	9.8	9.6	10.7	13.0	14.6	10.3	10.8	9.2
Median age, in years, of cancer patients	60.5	61.1	62.3	61.5	60.9	60.6	61.0	62.4	62.9	63.2	62.6
Cancer deaths in Massachusetts	5,454	5,611	5,672	5,813	5,859	6,153	6,382	6,675	6,483	6,777	6,831
Cancer death rate per 100,000 population	132.0	134.6	134.7	136.8	137.3	143.4	148.1	154.1	149.0	155.0	155.6
Male cancer death rate in Massachusetts age group 20-60	72.5	75.2	72.3	75.8	68.3	75.5	77.7	82.7	77.8	83.8	
Female cancer death rate in Massachusetts age group 20-60	118.8	118.4	115.7	116.4	119.1	120.6	115.2	120.9	111.0	111.7	

TABLE V.—*Percentage of Patients With Cancer Attending State-Aided Cancer Clinics Alive at Yearly Intervals Following Clinic Admission*

	1927–1936
Lost or unknown	2.2
Alive 1 year after	66.2
Alive 2 years after	54.0
Alive 3 years after	47.5
Alive 4 years after	43.4
Alive 5 years after	39.1
Alive 6 years after	35.7
Alive 7 years after	33.1
Alive 8 years after	30.4
Alive 9 years after	28.6
Alive 10 years after	24.5

TABLE VI. — *Attendance at State-Aided Cancer Clinics, 1937*

Total individuals attending clinics	4,098
Total individuals having cancer	1,319
Total individuals having precancerous lesions	378
Total individuals having postoperative cancer, no evidence of recurrence	131
Total attendance at clinics	4,284
Total cancer attendance at clinics	1,393
Total precancer attendance at clinics	359
Total postoperative cancer, no evidence of recurrence, attendance at clinics	139
Total diagnoses	4,326
Total cancer diagnoses	1,413
Total precancer diagnoses	398
Total postoperative cancer, no evidence of recurrence, diagnoses	137
Percentage of individuals with cancer	32.2
Percentage of individuals with precancerous lesions	9.2
Median age of total clinic patients	54.0
Median age of cancer patients	62.6

TABLE VII.—*Attendance at State-Aided Cancer Clinics and Contact with Physician, by Individual Clinic, 1937*

Clinic	Attendance of New Patients*			Cancer		All Others		Attendance of Old Patients
	Males	Females	Total	Referred by Physician	Not Referred by Physician	Referred by Physician	Not Referred by Physician	
Beth Israel	87	115	202	76	4	97	25	1,209
Boston Dispensary	147	209	356	127	12	181	36	1,819
Brockton	74	113	187	47	9	76	55	128
Fall River	60	88	148	49	8	55	36	262
Fitchburg	21	41	62	17	4	29	12	72
Gardner	16	34	50	8	2	32	8	44
Gloucester	13	23	36	7	0	27	2	43
Greenfield	23	31	54	17	2	34	1	37
Hyannis	12	21	33	11	0	20	2	29
Lawrence	39	50	89	33	8	30	18	62
Lowell	76	153	229	41	15	68	105	188
Lynn	119	200	319	74	19	98	128	499
New Bedford	70	172	242	49	7	123	63	170
Newburyport	16	31	47	11	2	30	4	44
North Adams	13	19	32	5	3	13	11	21
Northampton	13	73	86	17	0	67	2	53
Pittsfield	9	15	24	7	0	14	3	18
Pondville	715	863	1,578	535	58	760	225	2,505
Springfield	55	138	193	19	16	87	71	130
Westfield	10	5	15	3	0	10	2	2
Worcester	106	196	302	48	23	131	100	835

*Some individuals went to more than one clinic.

TABLE VIII. — *Residents of Massachusetts Cities and Towns Attending State-Aided Cancer Clinics*

	1936	1937
Number of places with 1 patient	50	57
Number of places with 2–5 patients	85	88
Number of places with 6–9 patients	36	35
Number of places with 10 patients and over	83	87
Total number of places	254	267

TABLE IX.—*Median Duration in Months Between First Symptom and First Visit to Physician and First Visit to Clinic, by Location of Cancer*

Location of Cancer	Median Duration Before First Visit to Physician		Median Duration Before First Visit to Clinic	
	1936	1937	1936	1937
Buccal Cavity	3.3	3.2	5.1	5.1
Digestive Tract	3.7	3.3	6.7	6.5
Respiratory System	3.8	3.8	6.7	8.7
Uterus	4.3	3.2	8.3	9.1
Other Female Genital Organs	3.8*	1.9*	6.0*	9.2*
Breast	4.2	5.3	6.8	7.2
Male Genitourinary Organs	4.5	3.2	8.8	8.2
Skin	12.1	12.2	12.8	12.8
Other and Unspecified Organs	2.9	2.3	5.1	6.5
Total	5.0	5.0	8.6	8.9

*Based on less than 25 cases.

TABLE X.—*Reason for Coming to Clinic, by Diagnosis*

Rate per 100*

Reason	Cancer		Precancerous Lesions		All Others		Total	
	1936	1937	1936	1937	1936	1937	1936	1937
Physician	79.9	86.3	63.7	66.8	60.8	68.5	67.2	74.2
Past Experience or Former Patient	15.1	12.7	33.6	32.9	11.5	12.6	15.0	14.5
Newspapers	2.4	1.6	3.6	3.3	9.3	4.5	6.5	3.4
Friends or Relatives	3.8	2.8	4.1	5.3	9.2	8.4	6.9	6.3
Social Worker or Nurse	3.7	3.2	4.8	5.5	6.2	4.6	5.2	4.2
All Others	4.8	1.9	2.0	2.3	7.8	5.9	6.2	4.3

*Does not total to 100 per cent as some individuals gave more than one reason.

TABLE XI. — *Location of Cancer*

Rate per 100

Location of Cancer	1936	1937
Buccal Cavity	12.4	12.5
Digestive Tract	14.0	14.6
Respiratory System	3.1	2.8
Uterus	9.6	10.2
Other Female Genital Organs	2.1	1.7
Breast	15.8	13.3
Male Genitourinary Organs	3.9	3.7
Skin	33.1	35.7
Other and Unspecified Organs	6.0	5.5

TABLE XII. — *Contact of Cancer Patients with Physician*

Rate per 100

	1936	1937
Referred by physician:		
One physician consulted	43.0	42.9
More than one physician consulted	35.3	42.3
Unknown	1.4	1.1
Not referred by physician:		
One or more physicians consulted	11.1	5.6
No physician consulted	6.9	6.4
Unknown	2.3	1.7

TABLE XIII. — *Contact of Cancer Patients with Physician, by Location of Cancer*

Rate per 100

Location of Cancer	No Physician		One Physician		Two or More Physicians	
	1936	1937	1936	1937	1936	1937
Buccal Cavity	7.0	6.5	55.7	53.3	37.3	40.2
Digestive Tract	1.1	1.0	39.3	30.5	59.6	68.5
Respiratory System	0.0	0.0	27.5	17.9	72.5	82.1
Uterus	2.4	2.8	51.6	38.0	46.0	59.2
Other Female Genital Organs	0.0	0.0	37.0	41.7	63.0	58.3
Breast	10.4	10.4	54.5	55.2	35.1	34.4
Male Genitourinary Organs	0.0	0.0	22.4	30.0	77.6	70.0
Skin	12.8	11.6	56.6	58.3	30.6	30.1
Other and Unspecified Organs	4.0	1.3	34.2	29.3	61.8	69.4
Hodgkin's Disease and Leukemia	0.0	0.0	27.8	33.3	72.2	66.7
Total	7.1	6.6	48.8	46.6	44.1	46.8

TABLE XIV. — *Symptoms that First Brought Patient to Clinic, by Diagnosis*

Rate per 100*

SYMPTOMS	1937		
	Cancer	Precancerous Lesions	Total
Swelling	27.6	19.1	30.3
Ulceration	33.5	26.9	19.1
Discharge and Bleeding	16.1	8.8	17.0
Pain	23.4	9.3	26.6
Deformity	7.6	40.5	10.8
Loss of Weight	12.1	1.5	9.5
Malaise	4.8	1.0	4.8
Observation	2.4	1.5	2.5
Itching	1.6	2.5	1.8
Scaly Skin	0.6	3.5	0.9
Others	23.2	10.6	23.0
Unknown	0.2	0.0	0.2

*Does not total to 100 per cent, as multiple symptoms were given by some patients.

TABLE XV. — *Operability of Cancer, by Location of Cancer and Sex*

Rate per 100

LOCATION OF CANCER	Operable Cancer Probable Cure		Operable Cancer Possible Cure		Operable Cancer Palliative Measures Only		Inoperable Cancer	
	1936	1937	1936	1937	1936	1937	1936	1937
MALES								
Buccal Cavity	41.9	37.3	29.7	32.9	25.7	28.6	2.7	1.2
Digestive Tract	2.3	1.4	31.8	35.7	44.2	42.9	21.7	20.0
Respiratory System	0.0	0.0	24.2	31.2	57.6	59.4	18.2	9.4
Breast	50.0	0.0	0.0	50.0	50.0	50.0	0.0	0.0
Male Genitourinary Organs	2.0	4.0	42.0	18.0	40.0	68.0	16.0	10.0
Skin	78.1	82.5	18.6	13.6	2.6	3.6	0.7	0.3
Other and Unspecified Organs	8.8	8.6	23.5	20.0	50.0	54.3	17.7	17.1
Total	42.4	43.8	25.8	23.7	23.7	26.3	8.1	6.2
FEMALES								
Buccal Cavity	25.0	36.4	58.3	54.5	16.7	0.0	0.0	9.1
Digestive Tract	11.4	3.6	40.9	30.4	29.5	33.9	18.2	32.1
Respiratory System	0.0	0.0	20.0	50.0	60.0	33.3	20.0	16.7
Uterus	5.7	5.6	38.2	34.5	45.5	49.3	10.6	10.6
Other Female Genital Organs	0.0	4.1	36.0	29.2	52.0	50.0	12.0	16.7
Breast	9.8	15.5	49.8	37.6	35.0	41.4	5.4	5.5
Skin	79.4	78.6	12.9	18.3	7.1	2.6	0.6	0.5
Other and Unspecified Organs	15.0	7.7	15.0	20.5	52.5	53.8	17.5	18.0
Total	27.0	30.1	34.4	29.7	31.3	31.4	7.3	8.8

Table XVI. — *Diagnosis**

Rate per 100*

Diagnosis	1936	1937
Cancer primary	21.95	21.72
Cancer with metastases	6.82	7.98
Cancer recurrent following operation	3.08	3.37
Original diagnosis non-cancer, changed to cancer	0.56	0.27
Original diagnosis postoperative cancer, changed to cancer recurrent	0.31	0.15
Original diagnosis precancerous lesions, changed to cancer	0.28	0.15
Diagnosed cancer at death	0.13	0.10
Original diagnosis postoperative cancer, changed to recurrent cancer of same site at death	0.03	0.05
Original diagnosis non-cancer, changed to cancer of same site at death	0.03	0.00
Original diagnosis non-cancer, changed to Hodgkin's disease	0.00	0.05
Original diagnosis cancer, changed to Hodgkin's disease	0.03	0.02
Original diagnosis Hodgkin's disease, changed to cancer	0.03	0.05
Hodgkin's disease and leukemia	0.44	0.59
Original diagnosis non-cancer, changed to cancer of another site at death	0.03	0.00
Original diagnosis postoperative cancer, changed to cancer of another site at death	0.00	0.02
Postoperative cancer, no evidence of recurrence	3.92	3.34
Original diagnosis cancer primary, changed to postoperative cancer	0.03	0.00
Benign tumors	9.97	11.37
Precancerous lesions	11.10	9.49
Original diagnosis cancer, changed to precancerous lesions	0.21	0.22
Original diagnosis cancer, changed to non-cancer	0.95	0.90
Diseases of the digestive system	7.23	6.61
Diseases of the circulatory system	1.51	1.39
Diseases of the genito-urinary system	11.03	11.18
Diseases of the respiratory system	0.69	0.46
Diseases of the nervous system	0.67	0.56
Diseases of the skin	6.85	7.00
Mouth lesions	1.82	2.76
Diseases of the bone	0.49	0.78
Diseases of the eye and ear	0.05	0.10
Tuberculosis	0.38	0.61
Diabetes	0.18	0.07
Pernicious anemia	0.08	0.07
Rheumatism	0.36	0.24
Goitre	0.21	0.24
Syphilis	0.36	0.32
Endocrine dysfunction	0.05	0.05
Undiagnosed	2.33	3.00
Deferred	1.82	2.22
No pathology	4.77	4.00
Non-cancer, diagnosis not established	0.72	0.98
All others	4.26	3.07

Postoperative cancer means postoperative cancer with no evidence of recurrence.

*Does not total to 100 per cent as some individuals had more than one diagnosis.

Table XVII.—*Tumor Diagnosis Service, 1937*

Specimens were received from hospitals listed below:

Acushnet Sanatorium and Hospital, New Bedford
Addison Gilbert Hospital, Gloucester
Angell Memorial Hospital, Boston
Anna Jacques Hospital, Newburyport
Audubon Hospital, Boston

Baker Clinic, Boston
Barnstable County Sanatorium, Pocasset
Barr Sanatorium, Lawrence
Bay State Hospital, Boston
Belchertown State School, Belchertown
Bellevue Hospital, Brookline
Benson Hospital, Haverhill
Bridgewater State Hospital, Bridgewater
Brockton Hospital, Brockton
Burbank Hospital, Fitchburg
Bessie Burke Memorial Hospital, Lawrence

Cable Memorial Hospital, Ipswich
Cambridge Relief Hospital, Cambridge
Cape Cod Hospital, Hyannis
Carney Hospital, South Boston
Central Hospital, Somerville
Charlesgate Hospital, Cambridge
Chester Hospital, Cambridge
Chestnut Street Hospital, Milford
Children's Hospital, Boston
Choate Memorial Hospital, Woburn
Clinton Hospital, Clinton
Clover Hill Hospital, Lawrence
Cohasset Hospital, Cohasset
Community Memorial Hospital, Ayer
Cooley Dickinson Hospital, Northampton
Cousen's Hospital, Waltham
Crocker Hospital, East Pepperell

Danvers State Hospital, Hathorne
Dover Street Clinic, Boston
Ducy Hospital, Brockton

Eaton Hospital, Brockton
Elmhurst Hospital, Weymouth
Emerson Hospital, Forest Hills

Fairview Hospital, Great Barrington
Farren Memorial Hospital, Montague City
Walter E. Fernald State School, Waverley
Florence Lying-In, Northampton
Forest Hills Hospital, Jamaica Plain
Franklin County Public Hospital, Greenfield

Gale Hospital, Haverhill
Gardner State Colony, Gardner
Glynn Hospital, Dorchester
Goddard Hospital, Brockton
Groton Hospital, Groton

Hale Hospital, Haverhill
Harley Hospital, Dorchester
Harvard Hospital, Worcester
Haverhill Municipal Hospital, Haverhill
Henry Heywood Memorial Hospital, Gardner
Hillcrest Hospital, Pittsfield
Hingham Private Hospital, Hingham
Holden District Hospital, Holden
Holyoke Hospital, Holyoke
House of Mercy Hospital, Pittsfield
Hunt Memorial Hospital, Danvers

Jordan Hospital, Plymouth

Kenmore Memorial Hospital, Boston

Lawrence Clinic, Lawrence
Lawrence Memorial Hospital, Medford
Leominster Hospital, Leominster
Louis Pasteur Hospital, Worcester
Lowell General Hospital, Lowell
Ludlow Hospital, Ludlow
Lynn Hospital, Lynn

MacLeod Hospital, Boston
Maplewood Hospital, Malden
Mary Alley Hospital, Marblehead
Mary Lane Hospital, Ware
Massachusetts Hospital School, Canton
Massachusetts Osteopathic Hospital, Jamaica Plain
Medical Clinic, Leominster
Memorial Clinic, Inc., Holyoke
Mercy Hospital, Springfield
Metropolitan State Hospital, Waltham
Miller's River Hospital, Winchendon
Milton Hospital, Milton
Moore Hospital, Brockton
Morton Hospital, Taunton
Mount Hope Hospital, North Dighton

Nantucket Cottage Hospital, Nantucket
New England Hospital for Women and Children, Roxbury
New England Sanitarium and Hospital, Melrose
Noble Hospital, Westfield
Northampton State Hospital, Northampton
North Reading State Sanatorium, North Reading
Norwood Hospital, Norwood

Providence Hospital, Holyoke

Riverbank Hospital, Boston

St. John's Hospital, Lowell
St. Joseph's Hospital, Lowell
St. Luke's Hospital, Middleboro
St. Margaret's Hospital, Boston
Somerville Hospital, Somerville
Springfield Cancer Clinic, Springfield
Springfield Hospital, Springfield
State Farm
State Prison Colony, Norfolk
Sturdy Memorial Hospital, Attleboro
Sunnyside Hospital, Somerville

Tessier's Hospital, New Bedford
Trumbull Hospital, Brookline

Union Hospital, Lynn
Union Hospital, New Bedford
United States Marine Hospital, Chelsea

Veteran's Hospital, Bedford
Vincent Memorial Hospital, Jamaica Plain

Wesson Memorial Hospital, Springfield
Westfield Sanatorium, Westfield
Weymouth Hospital, Weymouth
Whitinsville Hospital, Whitinsville
Wing Memorial Hospital, Palmer

TABLE XVIII.—*Tumor Diagnosis Service, 1937*

City or Town	Number of Surgeons Sending in Specimens
Acushnet	2
Ashburnham	1
Athol	9
Attleboro	1
Ayer	1
Barnstable	2
Belmont	1
Beverly	2
Boston	108
Bourne	1
Bridgewater	3
Brockton	22
Brookline	2
Cambridge	14
Canton	3
Carver	1
Chelsea	3
Chicopee	1
Clinton	8
Colrain	1
Conway	1
Danvers	2
Easthampton	1
Easton	1
Edgartown	1
Everett	1
Fitchburg	4
Foxborough	1
Framingham	1
Gardner	18
Georgetown	1
Gloucester	5
Great Barrington	2
Greenfield	1
Groton	1
Groveland	1
Haverhill	27
Hingham	1
Holbrook	1
Holden	1
Holyoke	20
Huntington	1
Ipswich	5
Lawrence	36
Leominster	9
Lowell	9
Ludlow	2
Lynn	39
Malden	6
Mansfield	2
Marblehead	3
Marshfield	1
Mattapoisett	1
Medford	2
Medway	1
Melrose	3
Merrimac	1
Methuen	4
Middleborough	3
Milford	3
Milton	2
Monson	2
Nahant	1
Nantucket	3
Needham	1
New Bedford	21
Newbury	1
Newton	1
Norfolk	1
North Andover	3
North Attleborough	1
North Reading	1
Northampton	9
Northbridge	1
Northfield	1
Norwood	7
Oak Bluffs	1
Orange	1
Palmer	6
Peabody	5
Pepperell	1
Pittsfield	19
Plymouth	10
Quincy	3
Revere	5
Rowley	1
Russell	1
Salem	1
Saugus	1
Scituate	1
Seekonk	1
Shelburne	1
Somerville	20
South Hadley	2
Southwick	1
Springfield	31
Stoneham	2
Swampscott	2
Taunton	10
Uxbridge	1
Wakefield	2
Walpole	1
Waltham	4
Ware	4
Wareham	1
Warren	1
Watertown	3
Webster	2
West Bridgewater	1
West Newbury	1
Westfield	10
Weymouth	4
Whitman	1
Wilmington	2
Winchendon	4
Winthrop	1
Woburn	2
Worcester	9
Total	645

REPORT OF DIVISION OF BIOLOGIC LABORATORIES

Elliott S. Robinson, M.D., Ph.D., *Director*

Roy F. Feemster, M.D., *Assistant Director**

Both laboratories of this Division continue to show increases in their activities. In the Wassermann Laboratory the number of specimens submitted grows steadily larger, and the scope of investigations has been expanded by the use of Federal funds. The work of the Antitoxin and Vaccine Laboratory has been affected by the increasing importance of pneumonia and the decreasing incidence of diphtheria.

1. Antitoxin and Vaccine Laboratory

1. General

The expansion of the pneumonia program has greatly increased both the volume and the complexity of the work. The cost of antipneumococcic serum coupled with the relatively small supplies usually available and the necessity of obtaining case histories has necessitated a more complex scheme for distribution than is needed for other products. Present plans, only partly in effect as yet, will require maintaining supplies of Type I serum at about 75 hospitals, and of serum for Types II, V, VII, and VIII at not less than 15 of these. When the supply of serum for the latter types is adequate, approximately 30 hospitals will keep it in stock. The amount of all serum is checked and maintained at a proper level by post-card reports of its use. All hospitals having supplies of therapeutic serums as well as certain others are prepared to do pneumococcus typings. The establishment of the necessary routine for carrying out these arrangements has required cooperative effort by this laboratory and the Division of Communicable Diseases. The services of Dr. Roderick Heffron should be acknowledged in this connection, for he was of great help. The appointment of Dr. Frank R. Philbrook as epidemiologist in the Division of Communicable Diseases is also aiding the program.

Acknowledgement of their generosity in supplying us with horses is due many of our citizens. During the last ten years about 60 per cent of our horses have been gifts.

The semi-annual inspection of distribution stations by the district health officers has served to prevent waste of products through over-ordering. Most of the stations now carry only reasonable stocks of products.

*To September 1, 1937.

2. Distribution of Products

Diphtheria	1933	1934	1935	1936	1937
Antitoxin, 1,000 unit doses	164,587	141,238	103,152	78,222	63,769
Schick Outfits, 50 doses each	7,100	7,084	5,954	5,109	4,905
Toxin-Antitoxin Mixture, 1 cc. doses	461,930	373,467	214,817	148,372	61,530
Toxoid, 1 cc. doses	22,002	125,731	209,760	218,857	274,759
Toxoid, Alum Precipitated, 1 cc. doses	–	–	110	–	–
Toxin (Bulk), cc.	10	175	115	300	580
Scarlet Fever					
Convalescent Serum, vials	231	605	302	101	56
S. F. Streptococcus Antitoxin, doses	2,207	2,568	2,490	1,873	1,893
S. F. Streptococcus Toxin, 5 cc. vials	128	700	718	805	636
S. F. Streptococcus Toxin, Heated Control, 5 cc. vials	–	–	256	568	447
S. F. Streptococcus Toxin for immunization, 1 cc. doses	–	–	–	240	105
S. F. Streptococcus Toxoid, 1 cc. doses	563	21,156	27,406	35,706	25,361
Pneumonia					
Antipneumococcic Serum, Conc., vials	2,957	2,382	3,717	3,438	5,800
Antipneumococcic Serum, (Bulk), cc.	–	–	–	2,000	200
Diagnostic Serums					
Pneumococcus Type I—horse, cc.	1,270	550	565	140	235
Pneumococcus Type II—horse, cc.	1,205	535	590	310	245
Pneumococcus Type III—horse, cc.	1,325	620	620	140	230
Pneumococcus Type V—horse, cc.	300	10	–	25	15
Pneumococcus Type I—rabbit, cc.	57	172	240	246	300
Pneumococcus Type II—rabbit, cc.	57	146	220	244	288
Pneumococcus Type III—rabbit, cc.	57	159	194	132	276
Pneumococcus Type V—rabbit, cc.	–	20	49	70	170
Pneumococcus Type VII—rabbit, cc.	–	–	–	3	134
Pneumococcus Type VIII—rabbit, cc.	–	10	56	48	162
Antipneumococcic Vaccine, Type II, 20 cc. vials.	–	–	–	86	–

	1933	1934	1935	1936	1937
Measles					
Placental Extract, vials	–	36	7,490	5,114	2,163
Sodium Citrate Solution, vials	1,230	1,784	1,707	1,246	943
Meningitis					
Antimeningococcic Serum, 15 cc. doses	2,960	2,959	3,640	4,670	3,339
Antimeningococcic Serum, Conc., 15 cc. doses	–	–	29	–	87
Influenza (Pfeiffer Bacillus) Antiserum, vials	757	913	1,128	1,148	2,118
Influenza (Pfeiffer Bacillus) Antiserum (Bulk) cc.	–	200	–	–	100
Miscellaneous Serums					
Typhus Serum, 20 cc. vials	20	667	418	21	1,194
Typhus Serum (Bulk), cc.	100	100	–	4,000	230
Calf Serum, vials	–	40	–	–	–
Horse Serum, Normal, cc.	20,865	19,960	29,959	58,830	87,585
Human Serum, Normal, vials	22	45	–	–	–
Poliomyelitis					
Convalescent Serum, vials	951	502	1,276	556	633
Enteric Fevers					
Typhoid Vaccine, cc.	–	–	–	–	54,471
Typhoid-Paratyphoid B vaccine, cc.	–	–	–	–	15,935
Typhoid-Paratyphoid A and B vaccine, cc.	89,297	98,412	95,356	188,118	116,743
Diagnostic Serums					
Typhoid, cc.	22	14	10	12	12
Paratyphoid A, cc.	25	15	10	5	17½
Paratyphoid B, cc.	25	15	10	5	17½
Flexner Dysentery Vaccine (dried), capsules	–	4,000	6,000	6,130	–
Flexner Dysentery Vaccine, 20 cc. vials	–	10	–	–	–
Other Products					
Smallpox Vaccine, capillary tubes	274,957	289,981	256,584	231,602	244,329
Tuberculin, ampoules—0.7 cc.	2,362	3,630	4,050	4,265	1,826*
Tuberculin, capillary tubes	–	–	–	–	11,625
Silver Nitrate Solution, ampoules	60,399	60,284	59,164	65,493	76,340
Typhoid-H antigen, 5 cc. vials	–	–	160	11	–
Serum Sensitivity Outfits	–	–	–	32**	646
Syphilis					
Arsphenamine, 0.3 gram (ampoules)	339	–	–	–	–
Arsphenamine, 0.4 gram (ampoules)	202	125	109	160	298
Arsphenamine, 0.6 gram (ampoules)	1,602	1,119	1,350	1,450	1,140
Arsphenamine, 3.0 gram (ampoules)	2,280	2,440	2,095	1,995	2,218
Sulpharsphenamine, 0.3 gram (ampoules)	2,045	1,780	1,932	2,137	2,697
Sulpharsphenamine, 0.4 gram (ampoules)	1,382	660	997	518	–
Sulpharsphenamine, 0.6 gram (ampoules)	4,655	4,800	3,127	2,622	2,929
Sulpharsphenamine, 1.0 gram (ampoules)	200	260	353	217	380
Sulpharsphenamine, 3.0 gram (ampoules)	268	180	100	89	150
Neoarsphenamine, 0.3 gram (ampoules)	–	–	–	–	1,510
Neoarsphenamine, 0.45 gram (ampoules)	12,320	14,948	16,610	17,010	18,962
Neoarsphenamine, 0.6 gram (ampoules)	32,050	32,170	35,060	34,119	33,249
Neoarsphenamine, 0.9 gram (ampoules)	13,880	18,200	18,520	17,320	16,350
Mapharsen, 0.04 gram (ampoules)	–	–	150	1,125	5,255
Mapharsen, 0.06 gram (ampoules)	–	–	150	1,500	5,600
Bismuth Salicylate in oil (10 cc. bottles)	–	–	–	–	768
Bismuth Salicylate in oil (2 oz. bottles)	–	–	–	947	2,294

*Of these ampoules 68 contained 204 cc. in all and 1,758 contained 0.7 cc. each.

**Through an error these figures were omitted from the 1936 report.

1. *Diphtheria Antitoxin.* The distribution of this product continues to decrease. This lessened distribution had already set in before 1933, the earliest year shown in the table. In 1924, the peak year, the equivalent of over 440,000 thousand unit doses were distributed.

2. *Diphtheria Toxin-Antitoxin Mixture and Diphtheria Toxoid.* The distribution of these two products taken together will be slightly lower in 1937 than in 1936. The distribution of toxin-antitoxin mixture for use in school clinics was discontinued in March because it was believed that toxoid was definitely superior as an immunizing agent. Despite one or two complaints, the substitution of toxoid appears to have been generally satisfactory.

3. *Scarlet Fever Convalescent Serum.* Because of the slight interest in the use of this product, no more will be obtained for the present.

4. *Scarlet Fever Streptococcus Toxin and Toxoid.* These are used in the study described below.

5. *Antipneumococcic Serum.* The number of vials distributed has increased nearly 70 per cent over last year. The increase in units is not as large for less

bivalent serum was distributed than in previous years. The distribution of serum for Type V, begun in the spring, was discontinued when the supply ran out but this type of serum is again available and presumably will be from now on. Serum for Types VII and VIII, in preparation, was not available before the end of the year.

Previous annual reports have shown the distribution of antipneumococcic serum only in terms of the number of vials distributed. In view of the increasing number of types of serum supplied, it seems desirable to show distribution in terms of units and types, which is done in the following table:

	Type I Units	*Type II Units*	*Type V Units*
1935	65,822,500	45,223,750	—
1936	88,540,000	51,942,500	—
1937	121,060,000	75,880,000	15,139,500

6. Pneumococcus Diagnostic Serums. The use of the rabbit serums continues to increase both because of the larger number of typing stations and because of the growing interest in pneumococcus typing. The use of the horse serums will probably stop in the course of the next few years.

7. Antimeningococcic Serum. The distribution of this product should decrease as sulfanilamide therapy is substituted for the use of serum. Our distribution figures do not reflect the increasing use of the drug as yet.

8. Influenza Serum. The cost of preparation and distribution of influenza (Pfeiffer bacillus) anti-serum was taken over by the State in November, 1936 and the product made available for general use. Because of this the distribution shows an increase of over 80 per cent.

9. Poliomyelitis Convalescent Serum. In accordance with the action of the Public Health Council, this product will no longer be prepared, for there appears to be little belief in its efficacy.

10. Typhoid-Paratyphoid Vaccine. About 87,134 cc. of vaccine were sent to Kentucky during the floods in January, but the distribution within the State was about the same as in previous years.

In April the Public Health Council approved the suggestion that paratyphoid vaccine should be discontinued and that only a monovalent typhoid vaccine should be distributed. This action was taken because there was little if any paratyphoid fever in the State and because the U. S. Army and the U. S. Public Health Service both recommended and approved the use of monovalent vaccine. It was felt that the monovalent vaccine would be as satisfactory as the trivalent and would produce less reaction. Shortly after this decision of the Council an outbreak of paratyphoid fever due to bacillus paratyphosus B made another change desirable, to permit the inclusion of the paratyphoid B strain in the vaccine. The present product is a bivalent vaccine containing typhoid and paratyphoid B organisms. This would appear to be the best product for our use here during the next few years until the incidence of paratyphoid fever again returns to its previous low level.

11. Tuberculin. This product was dispensed only in ampoules containing about 0.7 cc. until January. Because this outfit was uneconomical when a physician desired to do only a few Pirquet tests a new type of outfit was placed in distribution in which the tuberculin is contained in capillary tubes, each tube containing enough for a single test. Ampoules are available for clinic use and for the Mantoux test.

There has been so much difficulty in making a product of satisfactory potency that it has been necessary to purchase most of the tuberculin used during the year.

12. Silver Nitrate Solution. The distribution has been about 15 per cent higher than in 1936 and nearly 30 per cent higher than the average for the previous years. This is undoubtedly due to the regulation requiring the use of this product in preference to other prophylactics for the prevention of ophthalmia neonatorum.

13. Serum Sensitivity Outfits. It has been apparent for several years that an outfit containing serum for use in testing the sensitivity of patients to horse serum was needed. The usual practice of making fresh dilutions of horse serum each

time they were required was not as simple as seemed desirable, particularly when it had to be done in the patient's home. Beginning in December, 1936, outfits containing serum already diluted for use in ophthalmic or skin tests were made available. The distribution has not been large but will undoubtedly increase when physicians are more generally aware that such outfits are obtainable.

14. Arsenicals and Bismuth. These are distributed under the direction of the Division of Genitoinfectious Diseases. Attention is called to the increase in both the number of packages and variety of packages distributed now as compared with previous years.

2. Expenses

Year	Personal Services		Expenses		Total	
	Appropriation	Spent	Appropriation	Spent	Appropriation	Spent
1933 . . .	$66,860 00	$65,699 94	$34,768 41	$31,945 31	$101,628 41	$97,645 25
1934 . . .	63,530 00	62,478 89	38,234 98	33,417 44	101,764 98	95,896 33
1935 . . .	70,970 00	69,976 74	37,662 06	33,768 19	108,632 06	103,744 93
1936 . . .	77,680 00	77,416 32	36,500 00	35,441 04	114,180 00	112,857 36
1937 . . .	80,000 00	77,339 61	36,813 62	34,423 30	116,813 62	111,762 91

The increased appropriation for personal services was necessitated by salary increases. The actual expenditure was slightly lower than in 1936 because of vacancies. The other expenditures differ only slightly from the previous year.

3. Improvements

The refrigerating equipment has been increased by the addition of another ice cream freezer which may be run at a very low temperature. This can be used for the preparation of placental extract and in an emergency could be used for the storage of smallpox vaccine. The problem of increased refrigeration space must be met within the next few years for the large variety of products now made requires more storage space than we have available.

4. Personnel

There have been no changes in the number or grades of positions paid from the State appropriation. Under the United States Public Health Service appropriation there is provision for an Assistant Director, a Senior Chemist, a Junior Bacteriologist and a Stableman. All of these positions have been filled except that of Assistant Director. Because of the resignation of Dr. Roy F. Feemster to accept the position of Director of the Division of Communicable Diseases we now have two vacancies in the Assistant Director grade. Both of these positions should be filled as soon as suitable candidates can be found.

5. Educational Activities

The usual educational activities have been carried on. There were seventeen demonstrations at the laboratory for medical and public health students attended by 569. There was a course in Applied Immunology attended by nine and the laboratory participated in the Simmons College course for Laboratory Technicians, attended by four. The Assistant Director gave three talks outside the laboratory attended by 105 people and papers and reports were read at the meeting of the American Association of Immunologists and the American Public Health Association. Laboratory workers from Argentine, Brazil, Colombia, Denmark, England, France, Manchuria, Roumania and Venezuela visited the laboratory.

6. Investigations

(*a*) The study referred to last year of the preparation of diphtheria toxin on synthetic media has been continued and the method is in routine use. Diphtheria toxin has been purified and toxoid prepared from it.

(*b*) Similar investigations on the production and purification of streptococcus toxins are under way.

(*c*) The results of the field study of immunization with scarlet fever streptococcus toxoid were reported at the meeting of the American Public Health Association and are given at greater length in the report of the Division of Communicable Diseases.

(*d*) The methods of concentrating antipneumococcic serum are being investigated with the hope of finding one which will be uniformly satisfactory. This, together with work on the potency testing of these serums has taken all the time available for investigation of pneumococcus products.

(*e*) The study of placental extract is still handicapped by the lack of a suitable experimental animal. Until the transmission of measles to laboratory animals is accomplished, progress in the study of this product will continue to be extremely slow.

7. *Inspection*

The usual inspection of the laboratory by an officer of the United States Public Health Service was done on June 30, 1937.

8. *Publications*

The seven papers published in 1937 are listed on page 26.

II. Wassermann Laboratory

William A. Hinton, M.D., *Chief of Laboratory*

1. *Tests and Examinations*

The number of specimens received has once more reached new high levels. Tests for serologic examination for evidence of syphilis show an increase of approximately 28 per cent. The number of gonococcus complement fixation tests shows an increase of 40 per cent. The increase in specimens for agglutination tests for Brucella abortus is relatively not as great as last year.

	1933	1934	1935	1936	1937
Wassermann Tests	106,211	40,125	17,477	20,036	17,823
Kahn Tests	18,541	4,260	–	–	–
Hinton Tests	30,371	95,036	127,488	145,137	186,387
Davies micro Hinton Tests	–	–	–	–	1,659
Davies-Hinton Tests on Spinal Fluids	–	–	–	–	835
Gonococcus Fixation Tests	3,657	4,343	5,209	6,619	9,196
Lange's Colloidal Gold Tests	106	178	158	127	546
Complement Fixation Tests for Glanders	74	37	29	25	27
Diagnostic Examinations for Division of Live Stock Disease Control:					
(*a*) Complement Fixation Tests for Glanders	11	17	12	6	12
(*b*) Examinations for Rabies	301	496	491	335	460
(*c*) Pathologic and Bacteriologic Examinations	21	14	5	20	7
(*d*) Agglutination Tests for Brucella Abortus	11,921	14,653	17,701	23,300	25,431
	171,214	159,159	168,570	195,605	242,383

The above table gives an incomplete picture in that some of the figures represent tests performed and others are for specimens submitted. Therefore, the following table has been prepared in the form which will be followed in future reports. Both tables are given this year to permit correlation of previous and future reports.

Kind of Specimen		1937
Blood	No. of Specimens	215,293
	Tests	
	Hinton	186,387
	Wassermann	8,912
	Davies Micro-Hinton	1,659
	Bacillus Abortus Agglutination	25,431
	G. C. Compl. Fixation	9,196
	Glanders	39
Spinal Fluid	No. of Specimens	8,910
	Tests	
	Wassermann	8,911
	Davies-Hinton	835
	Gold Sol	546
Rabies Diagnosis	No. of Specimens	460
	Tests	
	Impressions	460
	Sections	455
	Animal Inoculation	275
Path. and Bact. Examin.	No. of Specimens	7
	Tests	
	Sections	2
	Animal Inoculation	5
	Cultures	1
	Total Tests	243,114
	Total Specimens	224,670

2. *Expenses*

Year	Personal Services		Expenses		Total	
	Appropriation	Spent	Appropriation	Spent	Appropriation	Spent
1933	$15,990 00	$16,554 38	$5,000 00	$4,916 27	$20,990 00	$20,750 66
1934	15,700 00	15,498 99	5,210 45	5,142 48	20,919 45	20,641 47
1935	16,990 00	16,580 64	5,201 00	5,188 25	22,191 00	21,768 89
1936	18,110 00	18,015 58	5,800 00	5,502 30	23,910 00	23,517 88
1937	18,700 00	18,549 68	6,000 00	6,012 02	24,700 00	24,561 70

The average cost per test has been reduced to about eleven cents. This figure takes into account the State appropriation shown in the above table as well as the salaries of two Stenographers and one Laboratory Helper who are paid from the United States Public Health Service Funds but are engaged in routine testing.

3. *Personnel*

The present personnel consists of one Chief of Laboratory, one Assistant Bacteriologist, one Supervising Laboratory Technician, one Laboratory Assistant, one Senior Clerk, six Laboratory Helpers and two Junior Clerks and Stenographers. Under the United States Public Health Service appropriation, there are the following positions: one Assistant Bacteriologist, one Laboratory Assistant, one Laboratory Helper and two Junior Clerks and Stenographers.

4. *Education*

In addition to the routine activities, the Wassermann Laboratory has furnished instruction to men in the second-year class of the Harvard Medical School, a class of ten senior students at Simmons College, six students from the Harvard School of Public Health and three special students from Simmons College. Besides this, the Wassermann Laboratory has, under the Federal Social Security Act cooperated in the instruction of serologists from the health departments of Ohio, Utah, Maryland, Rhode Island and Wisconsin. It has also furnished instruction to special students from California, Indiana and Toronto (Canada).

5. *Investigations*

Studies are being made of the treatment of syphilis in rabbits, of the use of the Hinton test in following the course of rabbit syphilis and in the culture of gonococci from patients. The Davies-Hinton method for serologic examination for the presence of syphilis although still in the experimental stage is being carried out routinely on such spinal fluids as are furnished in sufficient quantity. The first steps have been taken toward an evaluation of the serologic methods for the examination of syphilis employed in various laboratories in the State. This will be done by inviting laboratories to compare their results with ours when both laboratories examine the same specimens.

6. *Publications*

There has been only one publication, which was an editorial for the Journal of Genito-Infectious Diseases.

REPORT OF THE DIVISION OF CHILD HYGIENE

M. Luise Diez, M.D., *Director*

The activities of the Division of Child Hygiene were chiefly the following during the year ending December 31, 1937:

I. Activities of the Various Sections:

1. *Maternal, Infant and Preschool Hygiene:*
   - (*a*) Maternity Service
   - (*b*) Mothers' Classes
   - (*c*) Obstetric Package Project
   - (*d*) Maternal Mortality Study
   - (*e*) Premature Infant Program
   - (*f*) Well Child Conferences
   - (*g*) Summer Round-Up

2. *School Hygiene:*
   - (*a*) Millville
   - (*b*) Advisory Committee on School Hygiene
   - (*c*) School Hygiene Survey
   - (*d*) Study of Eighth Grade Children
   - (*e*) "Contact"
   - (*f*) School Physicians
   - (*g*) Summer Course at North Adams Teachers' College
   - (*h*) Audiometer Testing for Hearing
   - (*i*) Cooperation of Other Staff Specialists

3. *Public Health Nursing:*
   - (*a*) School Nursing
   - (*b*) Tuberculosis Nursing
   - (*c*) Communicable Disease Nursing
   - (*d*) Institutes for Nurses
   - (*e*) Health Clubs
   - (*f*) Crippled Child Program
   - (*g*) Premature Infant Nursing Program
   - (*h*) New England States Teaching Center
   - (*i*) Teaching Center at Reading
   - (*j*) Nursing Demonstrations
   - (*k*) General Nursing Service

4. *Nutrition:*
   - (*a*) Nutrition Advisory Committee
   - (*b*) School Lunch
   - (*c*) Well Child Conferences
   - (*d*) Dental Nutrition Service
   - (*e*) Community Nutrition Service
   - (*f*) Summer Camps
   - (*g*) School Clinics
   - (*h*) Home Visiting
   - (*i*) Nutrition Education
   - (*j*) Works Progress Administration

5. *Dental Hygiene:*
   - (*a*) Dental Health Teaching Unit
   - (*b*) Preschool Program

6. *Parent Education*

7. *Research Learning Project*

8. *New England States Teaching Center*

9. *Postgraduate Courses for Physicians*

10. *Refresher Courses for Well Child Conference Physicians*

11. *Health Education:*
    - (*a*) Schools
    - (*b*) Health Education Courses
    - (*c*) May Day—Child Health Day
    - (*d*) Publicity
    - (*e*) Exhibits, Posters, Pamphlets, etc.
    - (*f*) Library
    - (*g*) Lectures, Motion Pictures, etc.
    - (*h*) Prenatal and Postnatal Letters and Fathers' Letter
    - (*i*) Cooperation with Outside Agencies
    - (*j*) Staff Education
    - (*k*) General

II. Special Project
Audiometer Testing

III. Personnel

1. Maternal, Infant and Preschool Hygiene:

(*a*) *Maternity Service:*

Throughout the year the usual program of the Division in this field was carried out. The new requests for prenatal letters during the year totalled to 8,035 and the letter to fathers was sent to 8,035 fathers; there were registered for the first year postnatal letters a total of 7,609 new names of mothers, and over 15,000 were carried on the registry for the second year postnatal letters at the close of the year. Approximately 30,000 prospective mothers and mothers of children under two years of age receive this monthly instruction in maternal and infant care throughout the year.

Cooperation with the Reformatory for Women at Framingham was continued throughout the year. This service, given by our Public Health Nursing Supervisors, was carried on as required. In some instances the home visiting was done by the Division nurses personally and in other instances local nurses did the home visiting on mothers and babies who had been discharged from the Reformatory during the year.

(*b*) *Mothers' Classes:*

During the year three new Mothers' Classes were organized, the Division nurses assisting in the organization of such groups. Outlines for Mothers' Classes, prepared by the Division of Child Hygiene, were used in conducting the classes in local communities. Instruction in maternal and child care was given to 96 mothers who attended 8 of the Mothers' Classes.

(*c*) *Obstetric Package Project:*

This project provides for the furnishing of a sterilized obstetrical kit to physicians for home deliveries. The Nursing Supervisors of the Division demonstrate the complete package and its making to local women's organizations who desire to make up such packages. A miniature sample package is furnished by the Division of Child Hygiene to the organization. When the packages are completed they are sterilized in the local hospitals and kept in some place that is kept open day and night, such as the Fire Department, Police Department or a drug store, for the use of physicians.

The project did not get under way until the Fall of 1937. Ten cities and towns now have these kits available for use.

(*d*) *Maternal Mortality Study:*

Plans were made and organization completed for a Maternal Mortality Study to be conducted by the Section of Obstetrics and Gynecology of the Massachusetts Medical Society and financed by funds allotted to the Division of Child Hygiene. Investigators were appointed by a committee composed of members of the Section of Obstetrics and Gynecology, of which Dr. Raymond S. Titus is chairman. Each maternal death is inquired into by a physician who is particularly interested in obstetrics and the findings are brought back to the committee for study. Forms for the study were purchased from the United States Children's Bureau. Information on the death certificate was secured through the Division of Vital Statistics of the Department of the Secretary of State and transferred to these record forms. It is planned to continue this study over a five-year period. At the close of the year 1937 a total of 221 maternal deaths had been investigated.

(*e*) *Premature Infant Program:*

The program planned to lessen premature births and deaths was continued during the past year. Although organized during the latter part of 1936, the program did not get fully under way until after the beginning of 1937.

A law was passed by the State Legislature providing for (1) the reporting of premature births by physicians; (2) the transportation by local boards of health of premature infants born outside the hospital to hospital centers equipped for their care; and (3) the hospitalization of indigent prematures by local boards of public welfare. Copies of the law were sent to all physicians in the State and hospitals interested in becoming premature care centers were visited by the physician in charge of this Division activity. The passage of this law was an impetus to the program as hospitals evinced more interest in becoming centers and many requested that their hospital be approved as a center for the care of premature infants. At the close of the year hospital centers were established in twenty-nine hospitals, as follows:

Attleboro	Sturdy Memorial Hospital
Cambridge	Cambridge Hospital
Fall River	Truesdale Hospital
Fitchburg	Burbank Hospital
Gardner	Henry Heywood Hospital
Great Barrington	Fairview Hospital
Greenfield	Franklin County Hospital
Haverhill	Haverhill Municipal Hospital
Holyoke	Holyoke Hospital
	Providence Hospital
Hyannis	Cape Cod Hospital
Lawrence	Lawrence General Hospital
Lowell	Lowell General Hospital
Lynn	Lynn Hospital
Montague City	Farren Memorial Hospital
New Bedford	St. Luke's Hospital
North Adams	North Adams Hospital
Newton	Newton Hospital
Northampton	Cooley Dickinson Hospital
Pittsfield	St. Luke's Hospital
	House of Mercy Hospital
Salem	Salem Hospital
	North Shore Babies' Hospital
Springfield	Wesson Maternity Hospital
	Mercy Hospital
Taunton	Morton Hospital
Waltham	Waltham Hospital
Westfield	Noble Hospital
Weymouth	Weymouth Hospital

In April the nurse who was Public Health Nursing Consultant in the care of premature infants resigned so that the plans for nursing education program were much delayed. These plans are still incomplete but it is hoped that they may come to fruition during the early part of the coming year.

An improvised transportation basket and an incubator were devised and a working drawing was prepared of the latter. The incubator is now being tested at the Children's Hospital in Boston. Several hospital centers have copied the incubator and found it satisfactory.

A booklet, "Your Premature Baby," was published by the Department for use with mothers of premature infants. This leaflet was made available also to physicians and nursing organizations in the State in a quantity sufficient to meet their needs.

Cards were provided to all Boards of Health for the reporting of premature births in the home. When the report of a premature birth indicated that the infant remained in the home the leaflet "Your Premature Baby" was sent to the mother.

The Sub-Committee on the Care of the Premature continued to offer advice during the past year, two meetings being held for the discussion of the program.

(*f*) *Well Child Conferences:*

The organization plan for the Well Child Conferences and the Health Survey was revised during the year. On the whole the plan has proved to be satisfactory and the local committees, for the most part, have worked well under this plan.

This year, for the first time, the two Well Child Conference units worked throughout the year, with the exception of the month of August.

In 26 towns Well Child Conferences were held on the demonstration basis, with the idea that the local communities will take over the conference later. It now seems likely that in the near future Acton, Amherst, Ashland, Millbury and Newton will have their own Well Child Conferences. In Franklin County, where the demonstration Well Child Conferences were held for several years previous to this year, 15 of the 25 towns are now conducting, or partially supporting, their own Well Child Conferences.

The other type of conference given is the Health Survey which is carried on in small communities where there is no local nurse and where the follow-up is done by our own nursing supervisors. Otherwise, these communities would not have this type of service available to them. The Health Survey was conducted in 22 towns.

The following table summarizes the Well Child Conference and Health Survey activities during the year 1937:

SUMMARY—UNIT NO. 1 AND NO. 2 COMBINED—1937

Well Child Conferences—53 towns—4,082 children*
Nursery Schools — 9 towns— 253 children

	Number	Per Cent		Number	Per Cent
Infants examined	376	9%	Repeats .	252	6%
**Preschool children examined.	3,959	91%	Prematures	152	4%
Total children examined .	4,335	100%			

*Includes 188 children examined at W.C.C. where only part of the staff was provided by the State.
**This group includes 13 school children.

	Total		Infants		Preschool	
	Number	Per Cent	Number	Per Cent	Number	Per Cent
Children with defects	4,022	93%	233	62%	3,789	96%
Children without defects	302	7%	143	38%	159	4%
Unknown	11	0.3%	–	–	11	0.3%
Total children	4,335	100%	376	100%	3,959	100%
Minor defects	7,906	49%	392	58%	7,514	48%
Major defects	8,298	51%	280	42%	8,018	52%
Total defects	16,204	100%	672	100%	15,532	100%
No. of defects per child	3.7		1.8		3.9	
No. of minor defects per child	1.8		1.0		1.9	
No. of major defects per child	1.9		0.8		2.0	
Children with habit defects	2,623	61%	152	40%	2,471	62%
Children advised to see physician	1,557	36%	94	25%	1,463	37%
Children advised to see dentist	2,232	51%	–	–	2,232	56%
Children advised to see both	924	21%	–	–	924	23%
Children who have not been vaccinated	3,788	87%	376	100%	3,412	86%
Children who have not completed toxin-antitoxin	2,646	61%	353	94%	2,293	58%

(*g*) *Summer Round-Up:*

Cooperating with local Parent-Teacher Associations and other local organizations and nurses, the usual service was afforded in the way of providing printed material and advice for the conduct of this activity locally. Reports were received from 153 communities conducting Summer Round-Up examinations during the year; 8,801 children were examined.

In addition to the above the Well Child Conference Units of the Division carried on Summer Round-Up examinations of preschool children in 1 community, examining a total of 66 children.

2. School Hygiene:

(*a*) *Millville:*

Service by the Division personnel is continuing in Millville, in cooperation with Wellesley College, the State Commission and the State Department of Public Welfare.

Wellesley has given financial support without which much of the health work would have been impossible. The fund is administered, as usual, by a Steering Committee composed of representatives of the town, State and Wellesley College. The townspeople contributed a certain amount of money also.

Again a physician from the Division of Child Hygiene served as school physician for Millville and examined the children there. The following table covers the percentage of children found to have defects and the types of defects found during these examinations, over a period of years.

Results of Examination of School Children

Number examined	331
Number with defects	239
Number of major defects	349
Number of major defects corrected	141
Percentage of corrections	43%
Number of irremediable defects	15
Number of new defects	143*
Number of minor defects	296

*Defects among children entering school for the first time; more eye defects noted because of use of telebinocular in eye examinations; more new dental defects. Percentage of correction considered good.

Per Cent of Children Having Certain Defects

Most Prevalent Defects	Jan. 1935	Dec. 1935	Dec. 1936	Dec. 1937
Total number with defects	91	56	60	69
Nutrition defects	28	16	11	12
Posture defects	18	6	3	4
Teeth defects	84	27	45	52½
Throat defects	24	14	12	5½
Nose defects	9	4	6	3
Vision defects			3½	9½
Hearing defects			6	5½

In hearing testing an audiometer was used. There were tested 128 children; 28 were retested, and 15 were found to have hearing defects requiring medical attention.

In examining the eyes of the children 87 were tested with the use of a telebinocular, and 15 were found to have vision defects requiring medical attention.

Nursing service was given to school children by the local school nurse. The Wellesley College fund covered the expense of tonsillectomies for 21 children, these being done either by family physicians or clinic physicians. Through the same fund an eye clinic was arranged for where the children's eyes were examined and 7 were fitted to glasses.

The Division of Child Hygiene of the Department contributed the service of a Well Child Conference to which any parent who wished might bring a child between the ages of six months and six years for examination. The findings of this conference were as follows:

Number of children examined	76
Number of children needing medical attention	17
" " " " dental attention	35
" " " " nutrition attention	47
" " " " nose or throat attention	8
" " " without diphtheria immunization	57

All children with defects needing correction were referred to the family physician or family dentist, in families having them.

An educational program in dental hygiene was given in the schools by the Division of Child Hygiene dental hygienist with gratifying results. This preceded the dental clinic.

The Worcester County Extension Service provided dental clinic service financed by the townspeople, Wellesley College fund, and the children. The dentist reported 26 days' work; 460 treatments were given and 30 mouths with dental work completed.

Through the Works Progress Administration project a supplementary school lunch was furnished and was continued intermittently through the year.

The most significant development of the year was the authorization by the Commission of the employment of a public health trained nurse to assist in giving the preschool children the same chance for health as the school children are receiving. She assisted the mothers in carrying out the recommendations made at the Well Child Conference.

(*b*) *Advisory Committee on School Hygiene:*

The Advisory Committee on School Hygiene met to discuss the "Digest of Laws and Policies" and the bulletin for superintendents of schools, school physicians, teachers and parents. The Commission requested that the bulletin for superintendents and physicians be sent to all in the State and the "Digest of Laws and Policies" to the superintendents. This has been done.

(*c*) *School Hygiene Survey:*

A school hygiene survey was made in one community during the year. Recommendations were sent to the local school superintendent and school committee.

(*d*) *Study of Eighth Grade Children:*

The study of eighth grade children was completed and the findings will be published shortly. The purpose of this study was to learn how efficiently follow-up of health examinations is carried on as shown by correction of defects over a period of years; what defects tend to increase or decrease as the child progresses through the grades, and in what type of community corrections of defects are best carried out.

(*e*) *"Contact":*

This pamphlet, issued for school superintendents and school physicians, continued to be published during the year; five issues were sent out. Every specialty having to do with school health work was allotted a column in each issue of "Contact" for the inclusion of special messages in that particular field.

(*f*) *School Physicians:*

The group meetings of school committee members, superintendents and school physicians have been continued. Six dinner meetings were held, two in Southern Worcester County, two in Hampden County, one in Norfolk County and one in the Framingham region.

Committees were appointed by the chairmen of these meetings to arrange for additional meetings in the Spring. The total attendance at all meetings during the year was 136.

(*g*) *Summer Course at North Adams Teachers' College:*

At the request of the State Department of Education the services of the Consultant in School Hygiene were loaned to give courses in health education for teachers at the North Adams State Teachers' College during the summer.

(*h*) *Audiometer Testing for Hearing:*

This service is available to all rural schools chiefly, and to other towns where the service would not be made available otherwise. The work was done by the Public Health Nursing Supervisors and an Audiometer Technician. Assistance in correcting the tests was given freely by the teachers and nurses locally. This activity is reported more in detail under the heading "Special Project."

(*i*) *Cooperation of Other Staff Specialists:*

In the field of school hygiene service was given by Physicians, Dentists, Nursing Supervisors, Health Education Coordinator and other Health Education Workers; by the Parent Education Coordinator, Nutritionists, Audiometer Technician and Dental Hygienist.

3. Public Health Nursing:

There were some changes in the nursing staff. Three nurses were added to the staff—one to the school nursing field training center at Reading; one to Pembroke and one to Sturbridge, to demonstrate a general public health nursing program on a community basis.

The Chief Supervisor of Public Health Nursing continued to give consultation service to the Directors of the Divisions of the Department, to State organizations, visiting nursing organizations, Red Cross representatives, insurance companies, representatives in the nursing field and to other organizations, concerning program planning and other nursing matters.

A study of delivery nursing service, as given by one-nurse organizations, was completed during the year.

The chief objective of the Supervising Instructor in Public Health Nursing has been to stimulate the public health nurses in the State to improve their services in general and to increase the teaching content of each service according to the standards set up by the National Organization for Public Health Nursing. Several plans were worked out and put into effect as the various needs of different groups of nurses were noted.

An allotment of Social Security funds to public health nursing, for the training

of personnel, has made it possible to send 15 public health nurses to Simmons College for four months in either theory or field work, and 1 to Columbia Teachers' College for four months.

As a follow-up procedure one visit, at least, and sometimes more, was made by the Supervising Instructor in Public Health Nursing, with the Supervisors of Public Health Nursing, to each of the nurses granted scholarships, when they returned to their own communities. The purpose of these visits has been to help the nurses to see how the general principles of public health nursing which were discussed during the course could be applied to the individual situations in their own territory. These visits were made also to the two nurses who were granted a two-months' scholarship at the East Harlem Nursing and Health Service in New York City by The Commonwealth Fund of New York.

Three-day Tuberculosis Institutes were planned, in cooperation with the staffs of the various sanatoria. Two series were carried to completion in one county. It is planned to repeat these Institutes until opportunity for attending has been offered to all the public health nurses in the State.

Plans for nursing education program in the care of the premature infant were completed and visits were made to various hospitals in the State, with the Assistant Director of the Division, to establish centers for adequate care of these infants.

Considerable time was devoted to the establishment of the teaching center in the Berkshire Health District. The purpose of this project is to provide opportunity for nurses desiring rural field experience to obtain it under adequate supervision. It also provides opportunity for public health nurses in the State who cannot matriculate for courses given at a college, to obtain field experience in a generalized nursing program under supervision.

The Public Health Nursing Supervisors, who act as district representatives through whom the other specialists work, conducted surveys of available nursing services in the towns of their districts, 28 of these being completed during the year. Stress was laid upon the necessity for adequate record systems covering nursing services and consultation service was afforded the local nurses and nurse employing agencies.

In 78 local communities a study was made of delivery nursing service available.

The Nursing Supervisors stimulated prenatal nursing service, adequate maternity service, organization for Well Child Conference service, and Health Surveys of the preschool children, follow-up of nursery school children, and the care of the premature infant. In communities where Well Child Conferences were held each Public Health Nursing Supervisor served as a member of the unit conducting the conference and assisted in the preliminary organization. In communities where no nursing service is available they did home visiting upon children examined at Well Child Conferences. During the year 1,303 such home visits were made.

The Supervisors were in attendance at the clinics for crippled children; six were covered during the year. They assisted in the program meetings of five nurses' clubs, a series of eight meetings being planned for each; they conducted nine mothers' group meetings and were in attendance upon seven of the agricultural fairs during the Summer and Fall.

A total of 118 lectures was given by the Public Health Nursing Supervisors and other nurses of the Division during the year. New nursing services were established in 14 towns during the year, 5 of these being in towns of Franklin County where we demonstrated the Well Child Conference.

(*a*) *School Nursing:*

Valuable assistance was rendered by the Nursing Supervisors in plans and programs of local communities for adequate school nursing service; in promoting dental hygiene programs for school children; in the work with the audiometer testing of school children; in the matter of keeping adequate school nursing records; assisting newly-appointed school nurses in their school nursing programs, and also in the conduct of school nursing surveys. The Public Health Nursing Supervisors assisted in introducing health education teaching units into schools. Educational films were shown in many communities.

(*b*) *Tuberculosis Nursing:*

Conferences were held with school and visiting nurses relative to school clinics to encourage them to carry out the recommendations of the clinics—follow-up to secure X-rays at stated times, assisting families with having children placed in sanatoria, referring children not attending schools to local nurses for supervision, keeping adequate records, and the conduct of community surveys in the field of tuberculosis.

(*c*) *Communicable Disease Nursing:*

The Public Health Nursing Supervisors assisted the State District Health Officers in the program of prevention and control of communicable diseases. They helped to organize toxoid clinics, and gave assistance to local organizations in promoting and stimulating programs of education and service.

A series of small group conferences was held throughout the State by the Supervisors, with local public health nurses, to discuss the subject of Communicable Diseases.

(*d*) *Institutes for Nurses:*

This year the Institutes were carried on by the State Department of Public Health, the Commonwealth Fund assistance being no longer available. We are indeed most grateful for the financial assistance received through the Commonwealth Fund in former years.

Two Institutes were given for the staff nurses—one on the subject "Nutrition" and another on "Newer Aspects of Supervision as an Educative Process." In one county of the State two Tuberculosis Institutes were held for the nurses.

(*e*) *Health Clubs:*

The Health Clubs, four in number, held regular meetings during the year. A new one was organized in Chicopee. Besides the meetings of organized clubs the Public Health Nursing Supervisors have called group meetings of nurses in their districts for the discussion of various subjects within the public health field; 37 were held during the year.

(*f*) *Crippled Child Program:*

Cooperating with the Division of Administration, the Public Health Nursing Supervisors participated in the Crippled Child Program, through the local nurses. They assisted in the survey of crippled children in the State and also attended the clinics for crippled children in their respective districts.

(*g*) *Premature Infant Nursing Program:*

A full account of this program will be found elsewhere in this report. The Supervising Instructor in Public Health Nursing and a Public Health Nursing Supervisor assisted in this program.

(*h*) *New England States Teaching Center:*

This Center, as such, was discontinued in June. The Nursing Supervisor, who also assists with the premature infant nursing program, gave service at the clinic for premature babies held at the Child Study Center, attended the clinics and made home visits to babies after their return from the hospital. She also assisted in the teaching program in the course planned for Well Child Conference Physicians.

(*i*) *Teaching Center at Reading:*

In July, in order to establish a field training center for school nurses, the Superintendent of Schools of the Town of Reading was approached for cooperation because of the program already established. Complete cooperation was promised and in order to supplement the service a staff nurse was loaned to Reading.

This nurse organized and assisted at a dental clinic for preschool children during the summer months and made follow-up visits upon preschool children in preparation for school entrance. Assistance was given also at physical examinations, audiometer testing, and in the dental survey. Home visits were made upon school children for correction of defects found at the time of examination.

The following figures are submitted by the nurse in her report of activities for the year:

Inspection by nurse	451
Cases admitted to nursing service	23
Field nursing visits	59
Office nursing visits	166
Inspections by dentist	105
First aid	3
Sanitary inspections	6

Two of the Nursing Supervisors and the two Field Nurses assigned to Pembroke and Sturbridge observed the school service in Reading and one nurse was assigned to the teaching center there for complete field service.

(*j*) *Nursing Demonstrations:*

During the year nursing demonstrations were carried on in the towns of Pembroke and Sturbridge where a staff nurse was loaned to demonstrate the need of a community public health nurse.

Pembroke: Generalized nursing service was established in this town the first of June. Prior to this time there was available only school nursing service.

The Division Well Child Conference unit examined 37 preschool children. Organization by the local nurse for this service entailed 54 home visits and 53 follow-up home visits were made later to assist in obtaining the necessary corrections of defects found. In addition, 32 health supervision visits were made to children who had attended a previous conference.

The school physician examined 309 school children and since June the nurse made 109 nursing visits upon school children.

The audiometer test for hearing was given to the pupils in three grades. The number of defects corrected because of this service has been most gratifying.

Three maternity patients were given service during the year. One was carried for prenatal instruction, delivery nursing service, and post partum care. The others are still receiving prenatal nursing care. One tuberculosis case was carried by the nurse.

A Board of Directors of Nursing Service was organized to support and finance the service. This consists of representatives of official and non-official townspeople. A membership drive netted a membership of approximately 200 members.

Sturbridge: A staff nurse of the Division of Child Hygiene was loaned for a public health nursing demonstration to Sturbridge. Again, there was only school nursing in the town with occasional nursing service from insurance company nurses from out of town. Since the establishment of this service a contract was entered into with one of the large insurance companies for nursing service to its policy-holders.

A Well Child Conference was conducted by this Division and 141 home visits were made in connection with the examinations and follow-up of the children who attended the conference.

The public health nurse made 19 home visits for tuberculosis cases; 65 for morbidity; 24 prenatal; 1 delivery; 8 postpartum, and 107 visits to school children.

Assistance was given to the school physician during the physical examinations of school children; also to the dentist.

(*k*) *General Nursing Service:*

As in previous years, the staff nurses gave consultant service and advice to Visiting Nursing Associations, County Public Health Associations, Community Health Committees, boards of health, town managers, Parent-Teacher Associations, and other health, social and lay organization groups and individuals.

They cooperated also in the program planning of the State Nurses' Association, State Industrial Nurses' Association and State League of Nursing Education.

4. Nutrition:

(*a*) *Nutrition Advisory Committee:*

The Nutrition Advisory Committee continues to be most generous in its advice and counsel—individually and collectively—and we are deeply grateful for their support. The newly-elected president of the Massachusetts Dietetic Association replaced the retiring president on this Advisory Committee recently.

(*b*) *School Lunch:*

During the year there was a change in personnel in this project, due to resignation because of health. The program has progressed steadily and gratifyingly, nevertheless.

In carrying on the school lunch project 69 towns were visited, and the activity was carried on in 73 schools where 27 talks were given on the subject. In Barnstable County the demonstration nutritionist made 52 visits and held 31 conferences.

To meet a need a week's conference for school lunchroom managers was held at Fitchburg State Teachers' College, in cooperation with the State Department of Education, with an attendance of 28. Following this, more protective foods were added to school lunches; new school lunch rooms were added; record forms for accounts were introduced; 8 school lunch surveys were completed.

The Food Service Directors, an organization of national scope, held their annual meeting in Boston last year and the Division nutrition staff assisted in program planning for this meeting. From Massachusetts there attended these meetings 219 school lunchroom managers and other school representatives.

For the third year it is gratifying to know that the State Chairman of Child Welfare of the State Federation of Women's Clubs and the local chairmen are working throughout the State to secure better lunches for children. The Grange and the Parent-Teacher Associations also continue their interest in the project.

(*c*) *Well Child Conferences:*

Two nutritionists were assigned to the two Division Well Child Conference units to assist in the educational service provided by this activity.

A summary of the nutrition findings at the Well Child Conferences for the years 1936 and 1937, for both units, is as follows:

	1936		*1937*	
Number of children seen by nutritionists	3,506	–	4,237	–
Number of families represented	2,679	–	3,170	–
Number of children showing good nutrition	1,792	51%	1,974	46%
Number showing slight defect	1,169	33%	1,702	40%
Number showing moderate defect	414	12%	494	12%
Number needing immediate attention	131	9%	81	2%
Number needing more milk	828	24%	1,148	27%
Number needing more fruit	1,186	34%	1,571	37%
Number needing more vegetables	1,456	42%	1,974	46%
Number needing budget advice	614	18%	2,318	54%
Number needing more whole grains	1,497	43%	975	23%

(*d*) *Dental-Nutrition Service:*

State Sanatoria: One visit was made to each of the State Tuberculosis Sanatoria to discuss menus and food problems and to Westfield Sanatorium for the dental-nutrition study.

Reading: During the past year, the third of the study, 63 families were visited, representing 76 children in all. The economic conditions showed little change either way. Private dentists are reporting improvement particularly among some of the more troublesome cases. The report of the 76 children show the lines of greatest improvement by the following figures:

Better appetite	12
Increased use of milk	11
Increased use of raw vegetables	24

Increased use of cooked vegetables	11
Increased use of raw fruit	14
Increased use of other fruits	11
Increased use of dark breads and cereals	11
Increased use of eggs	18
Decreased use of sweets	21
Improved eating habits	14

Barnstable County: Dental-nutrition studies were carried on by the nutritionist assigned to the nutrition demonstration in Barnstable County, in two towns.

(*e*) *Community Nutrition Service:*

Nutrition Demonstrations: Two nutrition demonstrations were carried on during the year, one in Barnstable County and one in Southern Worcester County. To each a nutritionist was assigned on full-time service. Due to a change in personnel the progress in Southern Worcester County was retarded.

Barnstable County: Through the various activities interest as a whole has been developed. There are increasing calls for nutrition service from nurses for their families, requests for consultation by cafeteria managers, and a more general acquaintance with the fact that the nutrition demonstration is of use in the county. The County Health Officer has generously given a place to the nutritionist in his county plan.

The nutritionist was in attendance upon well baby conferences in 9 local communities in the county and 23 interviews were given. These were mainly on family budgets as they were infant feeding conferences. She also attended 10 Well Child Conferences, giving 222 interviews. These were Division Well Child Conferences.

At five Summer Round-Up Conferences the nutritionist gave 152 interviews.

Family visits were made to the number of 100, chiefly upon cases referred by various workers in the field. Social workers referred 4 of these; nurses, 19; camp directors, 21; and 56 visits were made in connection with the dental-nutrition study project.

Mashpee, a town under State administration, had a special nutrition project covering the school lunch and health education teaching in the school. A supplementary hot lunch was served to the school children for two months. This resulted in a 20% increase in the purchase of milk, the use in the homes of recipes made at the school, a difference in the attitude of the children toward their lunch, and a decided improvement in their table manners and social life during their lunch period.

Talks were given to small local organizations that they might become acquainted with the nature of the nutrition program. There were 13 such talks with 398 in attendance. In two communities Mothers' Nutrition Classes were held—8 in all, with a total attendance of 96. There were 373 conferences regarding the organization and development of the nutrition service in the county.

Before the introduction of the nutrition teaching unit into the schools there were 10 group meetings held with the teachers.

The nutritionist made 52 visits to school cafeterias in the county to give consultation service to the lunchroom managers.

The Health Camp was visited and recommendations made in regard to the nutrition program for the children.

Nutrition surveys and studies were made in 8 communities of the county.

Southern Worcester County: The program for this area was essentially the same as for Barnstable County, but there is not the same type of organization. This presented some difficulties, added to which a change in personnel delayed progress somewhat.

The nutritionist first assigned to the area gave service to 30 towns. This required 170 visits, the content of these visits including all types of nutrition service. For organization and development of the program, 65 conferences were held. In three sections of the area 16 nutrition classes were held for nurses. Nutrition talks were given to teachers in 5 towns in preparation for nutrition teaching in the

schools and visits were made to classrooms for talks given to pupils, in public schools and 1 parochial school.

Nutrition consultation service was given to local Boards of Public Welfare in four towns and home visits were made upon some of their clients. Other organizations in the area were given similar service.

The nutritionist attended one local Well Child Conference where a talk was given to a mothers' group. She attended also one of the Department demonstration Well Child Conferences at which 59 children were in attendance and 53 nutrition conferences were held. For follow-up service of a previous Well Child Conference 17 nutrition conferences were held with mothers of the children seen at the conference.

The second nutritionist assigned to Southern Worcester County demonstration held 22 conferences with 113 individuals with regard to planning and execution of the program.

Two Division Well Child Conferences were covered by this nutritionist, where 428 children attended, and 324 nutrition conferences were held with the parents and children.

This nutritionist attended the school health examinations held in one town where she conferred with 54 of the 60 children who attended.

Chicopee: In this city nutrition service was given for a group in special need. Family visits were made with the social worker to 15 families for the discussion of special problems, and nutrition advice given.

Two Well Child Conferences were held at which 56 children were examined and 37 nutrition conferences given. Follow-up home visits were made on children seen at these conferences.

For children whose families were receiving aid the nurses of the Department of Public Health reported the findings of the examinations to the Department of Public Welfare and follow-up home visiting and consultation service were given for those requested.

Nutrition service was given in four Nursery Schools and group meetings were held with teachers of high school pupils in preparation for teaching nutrition. Service was given also with regard to school cafeteria service and menu planning.

(*f*) *Summer Camps:*

Preconferences were held with 130 camp directors with regard to meal planning and buying for summer camps. These included directors of non-profit camps at the request of the Boston Health League; directors of health camps, at the request of the Massachusetts Tuberculosis League, and a group at the request of the Bouve School of Physical Education.

The nutritionists assigned to school clinic work of the Division of Tuberculosis of the Department, visited and helped with the work in camps, assisted by the nutritionists of this Division. A new plan was worked out for nutrition education of the parents of the children in the camps, so that the parents might be prepared to carry on in their homes the nutrition work with the children which was started by the camps. A number of home visits were made by the nutritionists during which menus were discussed and suggestions made for improvement in meal planning.

Menus were discussed and suggestions for improving food value at the present meal cost were given at the Massachusetts Geodetic Survey Camp, at their request.

(*g*) *School Clinics:*

As the work of the school clinics has been changed from so much work in elementary schools to high school work, a change has necessarily come in the approach of the nutritionist to the boys and girls. Although the parents are still reached in as many cases as possible, a plan has been prepared for conferences to interest the high school age group in order to secure their cooperation in the matter of good nutrition practices.

(*h*) *Home Visiting:*

A limited number of home visits were made by the nutritionists during the year. Where special need was indicated following the examinations at the Well Child

Conferences, visits were made to the homes to assist parents with budgeting and nutrition advice. At the request of social workers, public health nurses, welfare boards, boards of health and other agencies, the service of a nutritionist was made available wherever possible. Service was given in one county to clients of the Society for the Prevention of Cruelty to Children. In connection with these visits many conferences were held with the local nurses, welfare agents, and physicians. Eighteen families were carried during the year requiring over 50 visits.

(*i*) *Nutrition Education:*

State Teachers' College: In cooperation with the State Department of Education summer courses were continued at the State Teachers' College at Fitchburg. Two nutritionists were released for four weeks and gave courses to 40 home economics teachers, 28 school lunch managers, and 15 nurses. Three other members of the Division staff participated in this service.

The nutrition staff gave a total of 177 lectures during the year.

Institutes: A Nutrition Institute was held for the staff nurses. This covered a day and a half and was led by Pauline Murrah of the New York City Health Department. The subject of discussion was "A Nutritionist Answers Nurses' Questions on Food for the Family."

For public health nurses and social workers in Berkshire and Franklin Counties an Institute was held on problems that arise with fluctuating prices and lessened incomes. The nutritionist with the Westchester County Department of Public Welfare, Dorothea Sander, spoke on "The Family Pocketbook" and her talk was followed by round table discussions.

(*j*) *Works Progress Administration:*

Our cooperation with this organization service continued during the year, with the staff and with local administrators in the communities. This included suggestions for meal planning, cooking and serving of lunches, equipment and budget advice. Lecture service was made available and the nutritionists gave advice on the distribution and use of surplus commodities.

5. Dental Hygiene:

During the year a second dentist was appointed and the position of a dental hygienist was discontinued. The services of the dentist assigned to Massachusetts by the United States Public Health Service were continued during the early months of the year.

Dental health education for public health nurses and teachers for better integration of program, was carried on.

Surveys and studies were made of community dental programs in four communities and in two health districts.

A study was made of the program of dental hygienists employed in the State and work was begun on the development of a state-wide program in dental hygiene, with local dentists participating.

Cooperation was continued with dental organizations, both State and National.

One new leaflet entitled "Prevent Tooth Decay" was issued during the year and it was designed for use in schools. One issue of the Dental Bulletin was sent out during the year.

Numerous consultation visits were made by members of the dental hygiene staff, on request. A total of 27 talks was given by these staff members during the year.

A study was made of dental clinic service available throughout the State, including preschool clinics, school clinics, itinerant clinics and clinics for adults. In 217 towns local dental clinic service is available.

Dental certificates were used in 203 towns.

(*a*) *Dental Health Teaching Unit:*

A plan of dental health education was developed to make the best use of all health and education workers in the schools. Dental health units for the elementary and junior high school grades were planned with the Coordinator of Health Educa-

tion. They are now in print and being introduced into public and parochial schools of the State.

(*b*) *Preschool Program:*

A dentist and dental hygienist served on the Well Child Conference units of the Division throughout the year. At these conferences there were examined or inspected for mouth conditions 4,001 children.

The services of a dentist or dental hygienist were loaned to local Well Child Conferences at which 524 children were seen.

6. Parent Education:

The chief project of the work in Parent Education consisted in the selection and training of thirty lay leaders throughout the State. Their course of training was started in January, 1937, with one week's intensive training, followed by an examination, and they then embarked upon their various projects in their respective communities. In May the lay leaders returned for a two-day Institute to report progress, and were assigned summer work and were expected to perfect themselves on one subject of their own selection, approved by the Coordinator in Parent Education. They returned again in October for another week of twenty hours' intensive training, followed by an examination, and all are at present engaged in new projects. Each member of the group has been supervised personally by the Coordinator in Parent Education. A make-up group of those unable to attend the January Institute was held in Worcester and these members have fitted in well with the other leaders.

Twenty-eight community projects were carried on in communities and filled a need. Eighteen were with Mother Groups and three were Parent Institutes—one a three-day Institute and one a one-day Institute. One of the most interesting projects undertaken by one leader is a three-year course in parent education under the joint auspices of the Newton public schools and the City of Newton Health Department, with the Division of Child Hygiene. Another project is the training of mothers' helpers.

In connection with this work the Coordinator in Parent Education gave a total of 129 lectures. Courses of four lectures each on "Understanding Behavior" were given in seven districts to public health nurses and social workers. The Coordinator in Parent Education participated in the summer course held at Fitchburg State Teachers' College.

Health education material within the field of parent education was planned and prepared by the Coordinator in Parent Education for use in Division Well Child Conferences and for lecture purposes.

Many group conferences and conferences with individuals were held for the discussion of parent education problems. The Coordinator in Parent Education assisted at six Well Child Conferences and follow-up visits were made in the homes.

Opportunity was afforded the Parent Education Coordinator for refresher course work in New York at the Child Study Association of America and the East Harlem Nursing and Health Service.

7. Research Learning Project:

Progress has been made in this project, notwithstanding inability to make a permanent appointment in the position of ophthalmologist. However, we were fortunate in obtaining part time services of an ophthalmologist to assist in the study.

Three centers were established in the State, giving a good cross section of rural population and the needs of the children in those areas. The first and second grade children of these superintendency unions are being studied. In these areas the preschool children over three years of age are to be included in the studies and the physical examinations of these children have been begun by the Well Child Conference unit of the Division.

(*a*) *Reading Disability Study:*

There were examined in selected communities 100 cases of reading disability in grades above the second grade, with the use of experimental materials and devices.

Records were compiled for the study of certain aspects of the reading problem and experiments were carried on with techniques both for testing and for the correction of handicaps.

In the first and second grades 700 children were given the following examinations and tests:

Monroe Reading Aptitude Test—grade 1 only . . .	380
Haggerty or Metropolitan Primary Reading Tests—grade 2 only (given by teachers)	320
Eye examination—included 60 above 2nd grade (given by ophthalmologist, assisted by research assistant and teachers)	760

Photographic records were made of the eye movements of 106 children who have difficulty in reading.

Reports were submitted to superintendents of schools and the cases were followed with some classroom supervision. These included 34 teachers and 28 children.

The Head of the Research Learning Project directed the retraining work done by the teachers and gave lectures to parents. In all 25 lectures were given, the total attendance being 1,292. Supervision and interviews were afforded 91 persons.

(*b*) *Special Training:*

Special post-graduate training was made available to the Head of the Research Learning Project and the Research Assistant at the Dartmouth Eye Clinic at Hanover, New Hampshire. This covered one month's time for each.

8. New England States Teaching Center:

The special courses in child health services, planned by the Department of Public Health and the Harvard School of Public Health, and carried on under federal grants from the Children's Bureau and the United States Public Health Service, were continued until the end of the federal fiscal year which terminated June 30, 1937.

There were six physicians taking these special courses at the Teaching Center between January 1st and June 30th, 1937. Of these two were pediatricians of the Department, who carried on the medical examinations for one of the Well Child Conference units of this Division. One physician was from Oklahoma, two from Pennsylvania, and another from Virginia.

The course entitled "Program A" consisted of eight courses for four weeks each, each course being followed by a second course entitled "Program B" covering four weeks. In addition to the planned program for these courses, all students were given definite descriptions of the activities of the Division of Child Hygiene of this Department through personal conferences with the Director and other staff members, and printed matter and bulletins of the Department were distributed to all.

While the special courses provided by this project were discontinued the end of June, the service to the premature baby clinic, with home visiting, was carried on throughout the year 1937, through the Public Health Nursing Supervisor. Demonstration nursing service was given also to the teaching Well Child Conference for under-graduate students of Harvard Medical School as well as to the physicians attending the refresher courses for Well Child Conference physicians. Part time of this Public Health Nursing Supervisor was devoted to the premature program.

9. Postgraduate Courses for Physicians:

While the formulation of plans and the organization for these courses were completed late in the previous year, the first series was given during the Spring months of 1937. The plan included one series of lectures in obstetrics and one in pediatrics, each course consisting of five lectures, and each was given on a district medical society basis. In five centers of the State the Massachusetts Medical Society cooperated in giving these lectures. There were 293 physicians enrolled in these courses and an average of 152 attended all sessions.

10. Refresher Courses for Well Child Conference Physicians:

For physicians who were conducting local Well Child Conferences, or planning to do so, a refresher course was given, with the assistance of the staffs of the Harvard School of Public Health, the Boston Lying-In Hospital, the Children's Hospital, and other specialists. Preference was given to physicians from rural areas of the State. Four physicians registered for the first course given in the Fall of 1937, of whom three completed the course.

11. Health Education:

Through the Teacher-training Coordinator of Health Education and other members of the Health Education staff consultation service was given to superintendents of schools, school principals, teachers, public health nurses, and other groups and organizations.

Coordination of the various health education activities within the Division of Child Hygiene itself has continued and an Institute in Teaching Methods was organized and conducted for the nurses of the Division.

(*a*) *Schools:*

During the year detailed assistance was rendered especially to the rural schools of the State. Of the 75 superintendency unions which include the rural schools in Massachusetts, 37 have received service from the Coordinator of Health Education, through which 123 of the small towns of the State were reached.

Material for experimental school health teaching in 9 towns was prepared and field service rendered.

The Coordinator of Health Education served as executive secretary of the Committee on Health Education in the Secondary Schools of the State Department of Education. A report of the Sub-Committee of Health Administrators and Teachers, on health education material, was edited by the Health Education Coordinator. This course material is now being used experimentally in approximately 100 high schools of the State, the responsibility for follow-up work in the field being assigned to the Coordinator of Health Education. A series of lecture-discussions was conducted for teachers using this material.

In collaboration with the dentist and nutritionists of the Division staff teaching units on dental health and nutrition were developed and are being used in elementary and secondary schools.

The twenty-four hour study of high school activities, started in 1936, was brought to completion and the results will be published in the near future. A total of 8,949 pupils was included in this study.

(*b*) *Health Education Courses:*

The course for high school girls, formerly called "The Charm Course," was renamed with a more fitting title "Understanding and Improving Yourself," and is in great demand. There was complete revision of the course, and the material included in it was developed directly from the criticisms and suggestions made by the high school girls themselves. The revised course was given in 18 high schools during the year. Follow-up of the special course by one meeting for mothers of these girls, at the request of the school authorities, met with decided success. A subsequent meeting with the girls was given in 7 towns and 1 settlement house. This plan will be continued after each course for all schools.

Eighteen talks were given before the junior high school girls in 14 towns. Vocational Schools requested talks for girls in 4 towns. Settlement House groups also requested this service and 7 talks were given in 3 towns. Several other girl organizations have had the courses.

Single talks on the subject were given to 13 other groups and institutions on this subject.

The 4-H Clubs carried on a poster program during the year and the Health Education Worker cooperating in this activity gave talks to these club members in 25 towns.

To adult and children groups this staff member gave a total of 189 talks during the year.

(*c*) *May Day—Child Health Day:*

Child Health Day in Massachusetts was celebrated routinely in many of our school systems. In the majority of the schools now each classroom carries on its own celebration and reports are few of entire schools carrying on spectacular Child Health Day celebrations. The main emphasis in the celebration of Child Health Day is placed on the completion of the regular health program. Some schools still issue dental certificates to those children who, on Child Health Day, have had all their dental defects corrected.

During 1937 "Suggestions for Play Days" were once again distributed by this Department, in cooperation with the State Department of Education. Here, too, we find a trend toward routinized Play Day celebrations occurring as a part of the Child Health Day program. More and more high schools throughout the State combined in small centers to have well-planned and carefully supervised Play Days.

The Governor of Massachusetts issued a Child Health Day Proclamation; the Director of the Division of Child Hygiene, who served as Chairman of Child Health Day for Massachusetts, gave a radio talk on Child Health. An article on Child Health Day appeared in the New England Journal of Medicine published by the Massachusetts Medical Society. A newspaper release prepared by the Health Education Worker of this Division, was sent to all newspapers in the State. Several Visiting Nursing Associations made use of this celebration of Child Health Day as a suitable time for having window displays and special health meetings, and the Department cooperated in supplying pamphlets and other material for display. One large community celebration called "Health Day" was held in the Town of Hudson, when the Town Hall was filled with exhibits on health topics and the general public were urged to attend. In this also the Division of Child Hygiene participated, lending posters and exhibit material and providing pamphlets for distribution.

(*d*) *Publicity:*

Consultation service was rendered to a number of communities regarding suitable publicity material in connection with their preparations for Well Child Conference activities and in campaigns for funds and health weeks and other purposes.

The Health Education Worker of the Division continued to cooperate with the Department Publicity Agent in the preparation of news releases pertinent to the activities of the Division of Child Hygiene.

Material was prepared for state-wide news releases for the Division on Child Health Day, Mothers' Day, Hard of Hearing Week, and Christmas Toys.

(*e*) *Exhibits, Posters, Pamphlets, etc.:*

Special exhibits were prepared for display at the annual meetings of the Massachusetts Medical Society, State Dental Society, State Nurses' Association, for public library branches and other organizations. For the use of the Family Information Center connected with a large Department store, special exhibits were prepared and set up.

Three new card table unit exhibits were planned and prepared for use during the year, one on pasteurized milk, one showing comparison of prevalence of five communicable diseases, and the third, an explanation of the services offered by the Well Child Conferences. The latter includes photographs taken of the Well Child Conference units in action. These new table exhibits were prepared primarily for use at the State Fairs and were loaned for other purposes later.

Two members of the Health Education personnel spent considerable time in planning and executing exhibit material for the State Fairs. A large exhibit was prepared for use in Springfield at the Eastern States Exposition. Exhibits were displayed during the year at 18 agricultural fairs, an increase of 3 over the preceding year. These fairs were also attended by the Health Education personnel of the staff with members of the nursing and nutrition staffs also.

At all the fairs and other places where our exhibits were shown the printed pamphlets of the Department were distributed in quantity to those desiring it. Special order blanks for this material were distributed to the number of 1,594 at fairs alone, through which requests were received for 13,241 pieces of health ma-

terial. More than 13% of these were from out-of-state residents who visited our State fairs. Pamphlets were supplied in quantity to the Family Information Center in Boston and to other department stores for use in connection with Baby Weeks and to fill requests for such information from their customers.

In addition to the lending of exhibits to local organizations occasionally, they were displayed routinely at all the Well Child Conferences held by the Division staff and many staff members make use of them in their local activities. Posters, too, were displayed routinely at all Well Child Conferences of the Department. Likewise, the dental hygiene, health education, parent education, nursing and nutrition staff members used them in their community projects. The exhibits and posters are designed to cover all activities within the Division, according to age groups and specialties. They are constructed on a unit basis, permitting each subject to be used separately or assembled.

The Supervisor of Health Education for the Department and this Division executed 194 pieces of new illustrative material; 49 pieces were renovated, corrected or brought up to date during the year. He gave 2 lectures at Forsyth Dental Infirmary on Posters and Exhibits.

The usual visits to schools to promote the use of health education material were eliminated during the year because of the press of other work for the Supervisor of Health Education. Notwithstanding this, there were distributed to schools, through the school order blanks, 366,923 pieces of health education material. This material is supplied to public and parochial schools desiring it.

New material printed during the year included the following: "Food Wise—Money Wise"; "Your Premature Baby"; "An Act Providing for the Care of Certain Infants Prematurely Born"; "Improvised Premature Incubator"; "Dental Health in Elementary Schools"; "Prevent Tooth Decay."

The following were revised for reprinting during the year: "Food for the Little Child"; "Dental Health Policy"; "Your Guide for Buying and Serving Good Meals at Low Cost"; "Grocery Orders"; "Vitamin C Foods"; "Baby and You"; "Minerals and Vitamins"; "Cooking for Health," and several graphs and record forms in use by the Division.

During the year 16 pamphlets were reprinted with no change in content, and 6 new reprints were received for general distribution.

From Alaska, Hawaii and states other than Massachusetts there were received during the year a total of 662 requests for the printed material of the Department, and 47 requests were received from the following countries outside the United States: Australia, Canada, China, Colombia, Cuba, Czechoslovakia, England, Hungary, India, Jamaica, Japan, Netherlands, Newfoundland, Philippines, Porto Rico, Portugal, Roumania and Scotland.

From an approximate record of printed pamphlets distributed during the year there were requests for 859,383 pieces; of these 141,999 were dental leaflets.

(*f*) *Library:*

The Library Committee of the Department met several times during the year and recommendations were made for the purchase of books and subscriptions for the Department Library and the various special Division libraries. For the use of the Department staff there were added to the main Library a total of 142 new books and pamphlets, each catalogued when received. The Library carries magazine subscriptions to the number of 87 which are circulated throughout the Department to staff members, averaging about 32 journals daily. For special use of staff members under the Social Security program there were purchased 24 new books, 8 new pamphlets, 4 copies of special issues of certain journals, and 1 new subscription to a journal, all in specialized fields.

All books in the main library, excepting some United States publications, now have a title card, author card and shelf card. Many pamphlets were classified and catalogued during the Fall months, and association bulletins were rearranged on the shelves, for easy reference.

The four issues of the quarterly bulletin of the Department—"The Commonhealth"—issued for the year 1937 were as follows: "Pneumonia Study—Final Report"; "Diabetes"; "Health Education" and "Handbook for Physicians," the latter being a revision of an earlier number of the bulletin.

(*g*) *Lectures, Motion Pictures, etc.:*

There were reported as being given during the year a total of 1,247 lectures by staff members of the entire Department; this total included 14 radio broadcasts. Of this total 752 were given by members of the Division of Child Hygiene staff. These lectures were given in 250 communities of the State and 8 outside Massachusetts. Aside from radio listeners approximately 73,902 people were reached through the lecture service rendered by the Department staff.

Motion picture films on health subjects were loaned to 96 communities of the State and delineascope filmslides to 16 communities. Other than the obstetrical films which are not available for general use, there are 29 films, with from two to five copies of each, available for use in the State. Excepting during summer months when schools are not in session, all prints of these films are in almost constant use. It is planned to add to the film library when suitable films are offered for this purpose.

(*h*) *Prenatal and Postnatal Letters; and Father's Letter:*

At the close of the year there were on the registry for the monthly letters to prospective mothers and to mothers of children under two years of age approximately 29,870 names, as compared with 28,935 as a total for the previous year. The new requests for prenatal letters during the year totalled to 8,035; requests for the first year postnatal letters totalled to 7,609, both series of names being carried on to receive the second year postnatal letters later. At the close of the year there were registered for the second year postnatal letter service a total of 15,031 names. The letter to fathers was sent to 8,035 fathers during the year when the requests for prenatal letters were received at the Division.

(*i*) *Cooperation with Outside Agencies:*

We have continued our cooperation with other State Departments and organizations; also with local governmental units and organizations. A number of the staff members of the Division were chosen to serve on committees of national, state and local organizations interested in health and social programs for the promotion of the health of mothers and children and the family in general.

Cooperating with other agencies, members of the Division staff participated in a program of outlining the activities of the Division, and with planning field training for students from the Harvard School of Public Health, Yale School of Public Health, the physicians registered for the course for Well Child Conference physicians, nutritionists taking post-graduate courses at Simmons College, and visitors from other states and other countries.

(*j*) *Staff Education:*

All staff members of the Division attended two Institutes, one on "Newer Aspects of Supervision as an Educative Process" and another on "A Nutritionist Answers Nurses' Questions on Food for the Family."

The Assistant Director and one of the Child Welfare Physicians attended a lecture course on Maternal Hygiene given at the Harvard School of Public Health.

Both Child Welfare Physicians in charge of the Well Child Conference Units of the Division took a month's course in Child Hygiene, at the New England States Teaching Center. One of these physicians took a refresher course in Prenatal Clinic Service, 31 morning sessions, at the Massachusetts Memorial Hospital.

The dentist took a course at the Harvard School of Public Health, attended another at the Massachusetts Institute of Technology and also the Health Education Institute.

Several of the nursing staff members attended the Tuberculosis Institute held at Massachusetts Institute of Technology. One attended the Tuberculosis Institutes held in Essex County. A Consultant Nurse in the western section of the State attended a course in Mental Hygiene; an Institute on Syphilis and Gonorrhea given under the auspices of the Division of Genitoinfectious Diseases, and the Parent Education Institute held there for lay leaders in parent education. Two of the Nursing Supervisors were given refresher courses at East Harlem Nursing and Health Center, New York.

The Public Health Nutrition Supervisor was afforded refresher work in the observation of nutrition teaching in the New York schools. One Nutrition Worker attended the course for school lunch managers given at Fitchburg State Teachers' College, and another attended Forum Meetings held at the same Teachers' College during the summer.

The Coordinator of Parent Education took refresher work at East Harlem Nursing and Health Center and attended the Parent Education Institute held at the University of Vermont.

The Head of the Research Learning Project and the Research Assistant on that project were given opportunity to attend summer courses at Dartmouth Eye Clinic in Hanover, New Hampshire, to study problems in physiological optics and principles of orthoptic training.

All staff members attended a course in Parent Education planned for lay leaders in parent education.

(*k*) *General:*

The facilities of the Division, through its activities and field programs, were made available to students in all special fields who were taking postgraduate courses or making observation visits.

Two students taking postgraduate work in nutrition at Simmons College were given two days' field work a week during their semester of study.

Those assigned to Massachusetts from the United States Public Health Service were given special observation field work in dental hygiene and nutrition.

Physicians taking the course at the New England States Teaching Center met with members of the Division staff at stated intervals and were given opportunity for field observation, as were also the physicians taking the course for Well Child Conference physicians, the students from Yale School of Public Health, and the students at Harvard School of Public Health who elected Child Hygiene as their subject for study. Numerous visitors from other states and from foreign countries availed themselves of the same opportunity.

Members of the Division staff participated in planned courses in the following institutions: Simmons College School of Nursing, Simmons College School of Social Work, Harvard School of Public Health, Forsyth Dental Infirmary, Wheelock School, Boston University and Boston University Medical School, Harvard Dental School and Tufts Dental School.

II. Special Project

Audiometer Testing:

The program of testing hearing through the use of the audiometer was carried on continuously during the year, two audiometer machines being in almost constant use. An Audiometer Technician was employed in the Fall, and she with the Supervisory Nurses carried on the program in the schools.

At the request of the superintendents of schools audiometer testing was carried on in 105 towns during the year, and retesting completed in 105 towns. A total of 40,462 children was tested and 8,371 children were retested. Of those tested there were found to be 2,258 who needed medical attention. Of the total numbers tested the Audiometer Technician tested 10,299 children, retested 1,646, and of this number found 493 requiring medical attention.

The Audiometer Technician gave a demonstration of the use of the audiometer to the health workers of the Nashoba District, as well as instructing them in the manner of correcting the test papers, preparatory to their plans for carrying on such a program in their respective towns. She also gave a demonstration at the State House to a group of legislators on the Special Commission on Educational Matters, who were to consider the Act to provide teachers of lip-reading for those children showing the need of such instruction following audiometer testing.

In the towns of Webster and Dudley, because of retardation in reading, 18 children of the first and second grades were given the audiometer test individually, at the request of the superintendent of schools. This was done primarily to find out whether any hearing difficulty might be a contributing factor in these non-readers. The results were satisfactory in all but two cases; one was recovering

from a recent tonsillectomy and the other who seemed to be able to hear the numbers but was unable to repeat them. The principal of the school was present at this test and stated in the case of the latter child the lack of coordination between hearing and repeating numbers was typical of his classroom work. That child is to be referred to a Vocational Guidance Clinic in Webster for further observation.

In every community where the survey was conducted it was eagerly and agreeably accepted and the opinion was expressed always that the audiometer testing was such an improvement over former methods of hearing testing. Many cases of impaired hearing, hitherto undiscovered, were detected during these tests. Programs were planned for further consideration of conditions found and it now seems that the importance of hearing in the life of a school child is being definitely recognized.

III. Personnel

Resignations during the year included Marion Perkins, Public Health Nursing Supervisor; Genevieve Ely, Dental Hygienist; Elizabeth Franke, Public Health Nursing Supervisor for the New England States Teaching Center; Helen Inman Duff, Public Health Nutrition Worker; Helen Collins Fultz, Senior Clerk and Librarian; and William Butler, Junior Messenger.

Appointments to fill vacancies included the following: Dr. Catherine Ronan, Public Health Dental Supervisor; Catherine Blanchard, Margaret Clewley and Seater-Margaret Drever, as Infant Welfare Field Nurses; Dorothy Frank, Sophie Gordon, Catherine Hayes and Teresa O'Rourke, as Public Health Nutrition Workers; Helen T. Barrows, as Audiometer Technician; Etta Bloom, Statistical Clerk; Winifred Gilligan, Margaret Malone, Eunice Warren, Dorothy Worner, Anita Yeshman, and Geraldine Cronin, as Junior Clerks and Stenographers. Harold Gill was promoted to the position of Junior Clerk and Maurice Shanahan and James Stevenson were appointed to the vacancies in the position of Junior Messenger. To fill the vacancy in the position of Senior Clerk in the library Mary H. Smith was promoted.

The staff is now complete with the exception of one Infant Welfare Field Nurse, and a permanent appointment of an ophthalmologist for the Research Learning Project. The latter was not possible because of the difficulty in finding a physician specially trained for this research work. Dr. Albert Sloane, an ophthalmologist employed on a part-time basis, gave his services so that the program could continue until a permanent appointment could be made.

Massachusetts Statistics for 1937

Population (Estimated as of June 30, 1937)	4,404,220
Death rate per 1,000 population (residents of Mass.)	11.7
Death rate per 1,000 population (including non-residents of Mass.)	11.9
Infant mortality rate (per 1,000 live births)	43.8
Maternal mortality rate (per 1,000 live births)	4.1

REPORT OF THE DIVISION OF COMMUNICABLE DISEASES

Roy F. Feemster, M.D., Dr.P.H., *Director*

B. Barrett Gilman, M.D., *Assistant Director*

General Statement

The past year has been characterized by the lowest case rate and the lowest death rate for diphtheria in the history of the State. On the other hand, paratyphoid fever and whooping cough have been more prevalent than in any previous year. The total number of cases of communicable disease reported during the year was 97,391 as compared to 106,110 for 1936, most of the difference being due to a lower incidence of measles and mumps.

Prevalence of Certain Diseases

Anterior Poliomyelitis. The occurrence of 351 cases and 22 deaths brought the incidence of this disease back to slightly higher than normal levels after a record low year in 1936. The same trend was noted in other states in this section of the country.

The disease began early in the season with a focus in Newburyport, after which cases increased quite rapidly in the Merrimack Valley, the North Shore, and the Northern Metropolitan Area. By September 1, it appeared that the disease was likely to invade the heavily populated areas around Boston and that an unusually high year might result. The expected increase in incidence did not occur. Each week after September 1 saw a decrease in the incidence of the disease but new cases began to be reported from practically every section of the State, so that by the end of the season the cases were much more evenly distributed over the State than at any time in recent years.

Early in the season it appeared that there was an unusually high per cent of paralytic cases but, as the season progressed, the proportion seemed to change, perhaps due to the focusing of attention upon the presence of the disease, and the season ended with a fairly high proportion of nonparalytic cases. Out of 351 cases, 108 were reported to be nonparalytic.

This year for the first time we attempted to obtain the name of the physician caring for each patient so that information regarding the assistance which is available through the services to crippled children might be sent to them during the early period of convalescence. The response of the local boards of health in sending in this information has been quite good. In a few communities it was necessary to repeat the request two or three times before the information was eventually obtained.

Only 11 doses of convalescent serum were reported to have been used during this season. In some cases only one or two vials were administered, so that the total distribution of the serum was exceedingly low. Because of this lack of interest in the use of convalescent serum, it was recommended to the Public Health Council that the collection, processing, and distribution of the product be discontinued. Approval for this action was obtained.

Requests for consultants to aid in the diagnosis of the disease continue to be received. The practice of sending out a consultant only in cases where no paralysis had occurred has continued. In a number of instances the consultants were able to give desired information by telephone, but whenever it seemed indicated they were sent to see the case with the physician. The consultants saw patients with the physician in 40 cases.

In the past, physicians have been much disappointed that consultants were not sent out to see paralytic cases. Such consultations are now available by an orthopedic surgeon from the Services to Crippled Children. This will add a valuable feature to our program to reduce crippling by this disease.

Diphtheria. The remarkable downward trend in diphtheria incidence was continued during the year, and a fall in the number of deaths also occurred. Immunization programs in Lowell and Chicopee are responsible for a portion of the decrease in cases, since outbreaks in these two cities were responsible for more than their share of the cases last year. Marked seasonal fluctuations are disappear-

ing as the disease drops to lower levels. The residual endemic cases are as likely to occur in the summer or fall as in the winter, which was formerly the high season.

An outbreak of fifteen cases occurred in the Tewksbury State Infirmary. Cultures from all of those connected with the children's ward were taken and the children and mothers were immunized.

Well-organized immunization programs of considerable size were conducted in both Lowell and Quincy during the present year and most of the other larger communities continued their programs with increasing emphasis upon the preschool groups. The continued development of interest in immunizing the younger children is undoubtedly beginning to bear fruit, but it is only by keeping up interest in immunization programs that we will be able to hold diphtheria at its present low level.

During the year the Department has discontinued the distribution of toxin-antitoxin for use in clinics in school and preschool groups. Distribution will be continued for use in immunizing adults and older children since toxoid appears to give more reaction in this group than does toxin-antitoxin.

The Department has continued to recommend the use of fluid toxoid even in the face of the increased popularity of alum precipitated toxoid in many parts of the country. However, we are not alone in this stand because the Dominion of Canada has never taken up the use of alum precipitated toxoid. The City of Chicago has recently abandoned its use and is now giving three doses of fluid toxoid. The State of Oklahoma, which has just begun the manufacture of a prophylactic, intends to distribute fluid toxoid.

Studies have been set up under the auspices of the American Public Health Association which are planned to demonstrate the usefulness of certain kinds of immunizing agents and various methods of administration. Preliminary reports of these studies indicate that alum precipitated toxoid is perhaps superior in some respects to fluid toxoid, but there is some indication that one dose may not be sufficient. Perhaps two doses will be found to be a satisfactory plan of administering the material.

Dysentery, Bacillary.—The year has been characterized by an increasing number of small outbreaks of bacillary dysentery. The disease has continued endemic in the Belchertown State School and in the Fernald School. No large outbreak of cases has occurred within these schools but the constant presence of the disease has made it necessary to be continually on the alert for fear such an outbreak might occur. In March an outbreak of diarrhea occurred in the pediatric ward of St. John's Hospital at Lowell. Eight cases developed on the ward and four cases were found among the children in the homes of three of the patients. The etiological agent was not discovered, probably due to obtaining stools late in the disease, but bacillary dysentery was suspected. In September a family outbreak in Danvers caused the illness of four children and the death of two. The real cause of the illness was not recognized until a note of the first death appeared in the newspapers and our District Health Officer was sent to investigate the situation. Stool cultures from one of the children then ill showed the presence of Hiss-Y dysentery bacilli. In November, outbreaks caused by the same organism occurred in the pediatric wards of hospitals in Worcester and Fall River. About the same time, outbreaks caused by the Sonne dysentery bacillus occurred among children in hospitals in Cambridge and Wellesley. Fortunately, no deaths have resulted in these outbreaks as yet.

Gastro-Enteritis. The usual number of outbreaks of gastro-enteritis, apparently due to etiological agents other than the usual intestinal pathogens, have occurred during the year. In January the students residing in one of the forty-two dormitories of Smith College were attacked by one of the usual outbreaks of diarrhea which have occurred periodically in this school. Thirty-five out of seventy-five probably exposed were attacked. A few days before, two waitresses had diarrhea and were instructed to remain off duty until after recovery. In May a number of the children and faculty of a private school in Brookline became ill. Specimens were examined from many of the individuals affected, but none of the usual pathogens were found. In July another outbreak occurred at the Norfolk Prison Colony.

During the month of August, gastro-enteritis was reported from many parts of

the eastern portion of the State and investigation disclosed that many of these individuals became ill shortly after consuming lobster meat or crab meat, usually in the form of salads or sandwiches. Investigation failed to disclose any recognizable difference in the lobsters and crabs or in the methods of handling them. Inspection of the plants of dealers disclosed sanitary conditions which appeared to be not entirely satisfactory, but there is no reason to believe that conditions were any worse than they had been in previous years when no gastro-enteritis had occurred. Examination of specimens from persons affected and examination of samples of meat failed to yield any of the usual intestinal organisms responsible for conditions of this kind. During November an unusual incidence of gastro-enteritis was reported from Williams College in Williamstown. The health officer of the school made an investigation of the cases but again the etiological agent was not discovered. Early in December a large group of the students who ate at a common dining room at Harvard University were affected by a similar outbreak.

In the months of August and September, an outbreak of diarrhea occurred among the infants in the maternity ward of a New Bedford hospital, and four deaths occurred before the outbreak was brought under control.

The continued occurrence of outbreaks of this kind constitutes a problem in which the health officer will be at a disadvantage until further study reveals the cause of such illnesses. If some of them are due to viruses spread through the respiratory tract, it is hoped that the recent increasing interest in virus diseases may lead someone to undertake a study of these conditions. The constant presence of bacillary dysentery and the recent invasion of the paratyphoid bacillus demands that the health officer be constantly on the alert to demonstrate that the outbreaks which occur are not due to these intestinal pathogens. Practicing physicians have not yet become accustomed to sending in stool specimens for examination, being content to treat such conditions symptomatically.

"Influenza." The past year has again been remarkably free from scares or rumors of "influenza." The industries, schools, and other organizations reporting absenteeism have continued their cooperation, and machinery is ready to give us warning when an outbreak of this disease is impending.

Malaria. Fifteen cases were reported during the year, most of which were unquestionably infected outside of Massachusetts.

Measles. This disease, which was extremely low in 1935, became highly prevalent late in the season during 1936 and this increased incidence was carried over into the early part of 1937. There was a gradual downward trend of cases, however, so that by the end of the year the disease had again dropped to a low level. During 1937, 21,136 cases were reported as compared with 28,111 during 1936. The low fatality rate noted during 1936 was continued through this year.

Meningococcus Meningitis. The increased incidence of this disease noted last year continued through 1937 at a level slightly below 1936. One hundred sixty-six cases were reported as compared to 191 for last year. The number of deaths likewise continued at a fairly high level, 72 deaths being recorded as compared to 100 for last year.

Small foci occurred in two State institutions. At Tewksbury State Infirmary there were two cases and one death in January and February, and another case occurred in the family of one of the employees. At the Metropolitan State Hospital, four fatal cases occurred in March and April. These cases were among both employees and patients.

Paratyphoid Fever. This disease which has for many years been at a very low level has assumed considerable importance during 1937. Two hundred sixty-seven cases have been reported as compared to seven a year ago. Most of these cases were discovered in the investigation of four well-defined outbreaks. The first of these outbreaks was one which occurred in the North Metropolitan and Merrimack areas as the result of the eating of cream-filled bakery products. These products consisted of two big pieces of chocolate cake glued together with a sticky marshmallow cream and were known by various names, such as "Black Moons," "Devel Dogs," "Twins," or "Whoopie Pies." Investigation disclosed that many of those who were ill had eaten products which were traceable to one bakery. It was found on examination of food handlers in the bakery that one employee was shedding

paratyphoid B bacilli in his stool, but it was impossible to decide whether he was a temporary carrier responsible for infecting the pastries or whether he himself had become infected through eating the infected product. The distribution of the cases followed very closely the delivery route of the baker, communities in which he delivered his products seldom escaping and no cases being found in the communities where his products were not sold. The number of cases discovered in this outbreak eventually totaled 132, of which 116 cases were proven bacteriologically by positive stools to have been due to paratyphoid B bacilli, and the other 16 cases showed positive or suggestive agglutination reactions.

The second outbreak which came under investigation was one which occurred in Simmons College just as the school was breaking up. A very important problem arose due to the fact that a large number of the girls who had been exposed to the infection were leaving to take positions as waitresses and food handlers in many summer hotels throughout the country. It therefore became necessary to send notices to all of the students of the school, as well as to the health departments of the states into which they were going, to make sure that those who had become infected and were carrying paratyphoid bacilli should not engage in food handling capacities until bacteriological tests proved that they were free of bacilli. Unfortunately for the students, a number of them lost their summer employment due to the publicity which was necessary in order to notify authorities of the situation.

Investigation indicated that the outbreak was due to the consumption of chicken salad which was served on June 2 and to chicken salad sandwiches which were served on June 3. Most of those who became ill gave a history of having eaten on one or the other of these days and of having eaten either the chicken salad or the chicken salad sandwiches. In many cases the illness was so slight that a physician would not have been consulted had not the exposure been called to the attention of the students. Nine of those who had no symptoms at all were discovered to be carrying paratyphoid bacilli. One of the employees of the cafeteria, who probably had a part in preparing the chicken salad, denied having had any symptoms suggestive of paratyphoid fever, yet her agglutination tests were constantly weakly positive and her stool specimens were positive for paratyphoid B bacilli. Her stools have remained consistently positive to the present date. Whether or not she was the cause of the outbreak or a victim of it will never be known. Forty-seven individuals were found to have paratyphoid bacilli in their stools at the time of submitting a sample for laboratory examination.

The third outbreak was one which occurred among those who ate at one or the other of two meals which were served at the Deerfield Academy. This outbreak likewise occurred just as the school was breaking up and it was impossible to follow all the students to discover whether or not they had become ill. Notices were sent to all boards of health and state health departments in regard to the possibility of exposure but, since none of them were known to be planning to engage in a food handling capacity during the summer, there was less danger of spread from them than from the outbreak at Simmons College. Probably more than 1,000 individuals ate at one of the two meals which were served. However, there was no record of the persons actually present, so that notices could not go directly to a large number of those who may possibly have been exposed. Of 131 individuals who are known to have been ill, 13 showed positive stools, 30 showed positive or suggestive agglutination reactions, 64 showed negative stools or agglutination reactions, and no specimens were examined on 24.

A fourth outbreak occurred among those who attended a christening party in Easthampton. Of 29 individuals probably exposed, 13 developed symptoms. In five cases the diagnosis was confirmed by positive stools, in three by agglutination reactions, and in five no positive laboratory examinations were obtained.

Following these outbreaks, additional cases have occurred in various parts of the State and may possibly be due to individuals who became infected through one or the other of the outbreaks. However, it has been impossible to trace any connection.

Several individuals who were infected during these outbreaks continue to carry paratyphoid organisms down to the present time. Undoubtedly, there must be many others in the State who are likewise carrying the organism who have not

come to our attention. If this is so, it is very likely that the disease will continue to be present for some time and there is always the possibility that other food-borne outbreaks may occur.

Pneumonia, Lobar. The increase in the incidence of lobar pneumonia noted last year was continued through 1937 with 5,322 cases being reported as compared to 5,459 during 1936. The deaths have continued at a similar level, 1,846 being recorded as compared to 1,944 for 1936. When an increase in cases was noted in October, a high incidence for the coming season was expected, but the expected rise did not occur, November showing 269 cases which is below the five-year average for the month.

This is the second year that the pneumonia program has been completely carried at State expense. The fact that other states have begun to give considerable publicity to the initiation of pneumonia programs has stimulated greater interest here in Massachusetts. The continued reference to the pioneer work of this State in such publicity has assisted in focusing attention upon our program. Physicians who had not yet used serum have begun to make use of the services which are available.

During the year, physicians, who have reported deaths from pneumonia and whose names were not found on our list of physicians who had made use of serum in treating cases, were circularized and given an opportunity to ask that a member of the Division call upon them and explain the pneumonia program. A number of replies have come in from these physicians. The plan will be continued during the coming year.

Serum for treating Type V cases became available from our laboratory late in the Spring and several cases were treated immediately upon its release, apparently with excellent results. No serum for the treatment of cases due to Types VII and VIII was available during the calendar year, but a supply will be released soon after the first of next year. Before the end of the present pneumonia season, a change will be made in the method of distribution so that only monovalent Type I serum will be available at the eighty approved typing stations throughout the State. Bivalent Type II and Type V serum and bivalent Type VII and Type VIII serum will be available at all times through about fifteen typing laboratories chosen largely because of their geographical distribution. In addition to these fifteen laboratories, these two sera will also be made available, whenever the supply is sufficient, through certain other of the more active typing laboratories.

Doctor Roderick Heffron, who continued to assist us in our pneumonia program even after the end of the five-year study, left the State on September 1. Doctor F. R. Philbrook has been added to the staff of the Division to assist in carrying on the program. During the Fall, he began visiting the typing laboratories as a part of our program to improve this portion of the service. The setting up of a plan to use a fund to pay for laboratory work done by the cooperating laboratories on patients unable to pay has made it necessary to approve laboratories for examining blood cultures as well as for typing pneumococci from sputum. Several laboratories which have not previously undertaken to examine blood cultures are arranging to add this to their service in the near future. Every effort is being made to raise the standard of laboratory work to a very high level. The applications of other laboratories for approval are being considered with great care, and only when the laboratory service appears to be adequate is approval being given.

Rabies. While another year passed by without a case of rabies in humans, the incidence of the disease in animals again showed an increase after a remarkably low year for 1936. Two hundred eleven rabid animals were discovered in the State during 1937, 164 of these being animals which showed positive laboratory examinations and 47 animals found to be clinically rabid. The foci in the North Metropolitan Area and in the upper Merrimack Valley continued very active throughout the year. The focus in Worcester disappeared, but an increase of rabies throughout Worcester County has been noted. The focus in Templeton which began late last year continued throughout the early months of 1937, cases spreading both ways along the Mohawk Trail. A new focus has appeared around Norwood, and the year ends with rabies present in the southern fringe of Essex County and throughout a considerable extent of Middlesex, Norfolk, and Worcester Counties. Berkshire, Hampshire, Hampden, Plymouth, and Barnstable Counties

have been entirely free of rabies in animals throughout the year. No rabies has been found on the Islands of Martha's Vineyard and Nantucket.

We have continued to encourage the immunization of dogs as the only method which gives promise of aid in controlling this disease. Articles have appeared in the literature giving the results of experiments with rabies vaccines in laboratory animals which might seem to arouse doubt as to the effectiveness of the vaccination of dogs. However, the laboratory animals are exposed to the virus by intracerebral inoculation which gives effective exposures in approaching 100 per cent of animals, whereas the effective exposures by the bites of rabid animals are probably not much greater than 25 per cent, so that there is some doubt as to whether observations made in the laboratory can be applied directly in field control of the disease. However, the appearance of these articles has made it increasingly difficult to persuade boards of health to put on dog immunization clinics. In one county, the county agent followed up our District Health Officer with a letter from one of the authors and effectively discouraged the formation of clinics. During the past year, dog immunization clinics were conducted in the following communities:

Andover	Franklin	Maynard	Sharon
Arlington	Greenfield	Medfield	Sherborn
Athol	Hamilton	Medway	Somerville
Avon	Hingham	Millis	Stoneham
Belmont	Holbrook	Milton	Swampscott
Billerica	Holliston	Natick	Walpole
Brockton	Hopkinton	Needham	Watertown
Brookline	Ipswich	Newton	Wellesley
Canton	Lawrence	Norfolk	Westwood
Concord	Lexington	North Andover	Winchester
Dover	Lynn	Norwood	Winthrop
Everett	Malden	Salem	Wrentham
Framingham			

Scarlet Fever. Scarlet fever has continued at the low incidence recorded for the last three years which succeeded a peak in 1932 of the highest number of cases ever reported. This year 8,480 cases were reported as compared to 8,774 a year ago. The death rate has again declined with only 38 deaths recorded as compared to 44 for 1936.

Studies of scarlet fever immunization by use of a formalinized toxin have continued during the year. This makes the fourth year that community programs have been carried on in Wellesley, Framingham, and East Bridgewater, and the third year in Greenfield, Gloucester, Rockport, Holliston, and Bridgewater. In all of these communities, clinics have been held in public schools and every child who applied for immunization was Dick tested and those found positive were given three doses of the immunizing material. Similar programs are being carried on in the parochial schools of Worcester, Fall River, and Springfield. At the same time, the immunization programs in a number of institutions, including the children's tuberculosis sanatoria and the schools for the feebleminded, have been continued and nurses in several hospitals have been immunized with our formalinized toxin.

At the October meeting of the American Public Health Association, Doctor Anderson read a preliminary report on results of the work so far. He was very conservative in his claims, stating frankly that we had not been able to render as high a per cent of the children inoculated Dick negative as we had desired, but his figures indicated that a worth-while result had been achieved in reducing the incidence of scarlet fever among those who had received injections.

Attention is called to the fact that over 90 per cent of those who receive a second course of inoculations become Dick negative, which indicates that the material being used has good antigenic value but that the dosage which is being given may have to be increased in order to bring up the per cent of individuals rendered immune. It should be borne in mind that in this study our Dick tests have been given nine months or more after the third inoculation instead of two to four weeks after inoculations, which is customary in many immunization programs where

raw toxin is used. The ability of the material to keep an individual Dick negative for approximately a year is a much more severe test of antigenic quality than to do retests within a short time after inoculation.

Undoubtedly, an upward swing in the incidence of scarlet fever will take place within the next year or two. When this increase occurs, we shall probably have quite a severe test of the usefulness of the immunization resulting from the injection of our product. Up to the present time, the prevalence of scarlet fever in communities where programs have been in progress has been low and it was impossible to determine whether this was due to the increase in immunity among the population or due to the failure of scarlet fever to invade the community.

Septic Sore Throat. One hundred ninety-five cases of this disease were reported as compared to 156 for 1936. These were sporadic infections acquired through contact and there was no evidence at any time to suspect that milk might have been responsible for the spread of the disease.

Smallpox. Nineteen hundred and thirty-seven has marked the fifth consecutive calendar year during which there has not been a single case of smallpox reported in Massachusetts. There continues to be a certain amount of agitation to remove our compulsory vaccination law from the statute books but, due to the fact that the stories told by those who claim to have been injured by vaccination at Fitchburg in the outbreak there during 1932 have become so old that they no longer impress even the most ardent of those who appear at the vaccination hearings, the pressure from this group has become considerably less during the last year or two. The fact that so many of the private schools require vaccination keeps the immunity of the population of Massachusetts at a very high level.

Tuberculosis. While the reported incidence of pulmonary tuberculosis increased slightly early in the year, the death rate has remained about the same.

Typhoid Fever. This disease has again continued its downward trend, although the number of cases reported is slightly above the number reported in 1935. It was thought early in the Fall that this would be a year in which we would for the first time see the number of cases drop below 100, but an outbreak in Stoughton of 15 cases and 2 deaths followed a week-end party among a group of Lithuanians. A typhoid carrier was discovered among the food handlers who prepared the meals served on this occasion and a large number of the cases were among members of the families of the individuals who prepared the food. There is no indication that the food which was served to the guests who sat down at the meals contained typhoid bacilli. No individual whose only contact with the food was of this kind has contracted the disease. Investigation of the outbreak has been made difficult by the fact that many of those who attended the party speak very poor English, and most of them claim to speak less than they actually do.

There has been an increase in incidence in the Connecticut Valley and in Worcester County. Otherwise the distribution of the cases is very similar to last year.

Investigation of the 114 cases of typhoid that occurred during the year brought to light 16 carriers, and 4 convalescents whose stools had been positive for a year were added to the list, as shown by the following table. This is the greatest number of carriers ever discovered in a single year and reflects the vigilance and perseverance of our district health officers and epidemiologists in investigating sources of infection.

Year	Cases of Typhoid	Carriers Added to List	Rate per 100 Cases	Carriers Found in Investigation of Cases	Rate per 100 Cases
1933	162	19	11.7	14	8.6
1934	134	18	13.4	13	9.7
1935	112	15	13.4	12	10.7
1936	135	15	11.1	13	9.6
1937	114	20	18.4	16	14.0

The typhoid carrier list has increased from 115 to 127. Two carriers have died during the year, three were removed from the list following gall bladder removal, and two have moved out of the State. Four carriers have undergone gall bladder operations during the year and will probably be removed from the list during 1938.

Undulant Fever. The past year has shown a drop in incidence of recognized

cases of undulant fever from the level of 55 in 1936 back to 43 for this year, which is only one more case than was reported in 1935. Only two deaths have been recorded during this year. A large majority of these cases give a history of the habitual use of raw milk. Of the remainder, the majority give a history of having eaten at many different places and of having consumed milk about which they can give no definite information. The cases have been reported largely from the more sparsely settled areas of the State and there have, apparently, been no definite outbreaks, most of the cases being reported as solitary infections. Undoubtedly, a larger number of unrecognized infections which have not come to the attention of physicians have been present in these same areas.

The presence of this disease in the State continues to be one of the best arguments for the pasteurization of milk. The fact that the treatment of the disease is so unsatisfactory and that those suffering from the infection frequently continue to show symptoms over long periods of time gives additional grounds for insisting upon this method of protecting the health of the citizens of the State.

Whooping Cough. This disease has been very prevalent in the State during 1937, 13,333 cases having been reported, which is the highest number ever recorded for a single year. Along with the increase in incidence, the number of deaths again increased, but this number is smaller than was reported for 1934, even though the prevalence of the disease that year was less than the present year.

Other Diseases. One case of leprosy was discovered in an alien residing in New Bedford, who has since returned to Portugal of his own accord. Three fatal cases of Pfeiffer's bacillus meningitis were reported and undoubtedly others have occurred in the State, but physicians have either failed to recognize them or do not realize that the disease is reportable. Trichinosis continues to occur, 21 cases having been reported, one of them fatal.

Outbreaks

January. Gastro-enteritis; Smith College. Of 70 students in one dormitory, 35 were ill of nausea and vomiting followed by diarrhea. Cause not determined.

January–April. Meningococcus Meningitis; Tewksbury State Infirmary. Meningitis which had appeared at this institution in December, 1936, continued to manifest itself at the rate of one case per month until April. Measures to control the disease consisted essentially of attempts to eliminate overcrowding by restricting admissions and encouraging discharges. In January a fatal case developed in Lowell in the person of the mother of one of the employees of the hospital. (This employee developed meningitis in February.) 5 cases.

February–May. Scarlet Fever; Boston. In May the existence of scarlet fever among the staff of the Peter Bent Brigham Hospital was discovered. Cases had occurred since February. Following the exclusion from duty of persons with clinically abnormal throats and positive cultures, development of new cases ceased. Approximately 15 cases.

March. Meningococcus Meningitis; Metropolitan State Hospital. Four cases of meningitis occurred at the Metropolitan State Hospital, all of which were fatal.

March. Gastro-enteritis; St. John's Hospital, Lowell. An outbreak of diarrhea was reported in a family in Tewksbury. Of seven members, six came down with bloody diarrhea. Three children of the family were admitted to the pediatric ward of St. John's Hospital, Lowell, where three other cases developed as cross infections. 9 cases; 1 death.

April–May–June. Paratyphoid B Fever; North Metropolitan and Merrimack areas. An outbreak of paratyphoid fever involving the North Metropolitan and Merrimack areas occurred in April. The patients with few exceptions gave a history of eating a popular bakery product. A positive stool culture for paratyphoid B was obtained from one of the bakery employees. It was impossible to determine whether the individual was a temporary carrier or merely a walking case, due to the fact that the organisms soon disappeared from his stool. The actual cause has, therefore, not been definitely determined. There were 132 cases reported. Several of the cases were secondary.

May. Gastro-enteritis; Park School, Brookline. A number of children and faculty came down suddenly with gastro-enteric disturbances. Culturing failed to

disclose organisms of the dysentery or typhoid-paratyphoid group. The cause was not determined. Ice cream was suspected to be the vehicle of transfer.

June. Paratyphoid B fever; Simmons College. An outbreak of paratyphoid fever developed in students, faculty, and employees of Simmons College due to the consumption of chicken salad sandwiches served in the college cafeteria on June 2 and June 3. The exact number of cases will never be known because many were infected who showed absolutely no symptoms. The only lead in this outbreak is a cafeteria employee who helped prepare the chicken salad and who, although asymptomatic, has had consistently positive stools and negative Widals. Seventy-three recognized cases.

June. Paratyphoid B fever; Deerfield Academy. There were 131 persons discovered who developed symptoms, of whom 43 showed laboratory tests indicating paratyphoid fever. Although it appeared that the chicken salad was the vehicle for the spread, the source of the infection is not known.

July. Gastro-enteritis; Norfolk Prison Colony. Another explosive outbreak of gastro-enteritis occurred at the Norfolk Prison Colony. No definite cause was found.

July–August. Diphtheria; Tewksbury State Infirmary. Fifteen cases of diphtheria were reported from the Infirmary. Cultures from all the people connected with the Children's Ward were taken, and children and mothers were immunized.

August–September. Bacillary Dysentery; Belchertown and Fernald State Schools. This disease continued to be endemic in Belchertown State School and the Fernald School, where an occasional case continued to be discovered in spite of precautions taken against the spread of the disease. 5 cases at Belchertown; 16 cases at Fernald.

August. Paratyphoid B Fever; Easthampton. An outbreak of paratyphoid fever was discovered among those who attended a christening in Easthampton. 13 cases, 4 of them in Connecticut residents.

August. Gastro-enteritis. An unusual amount of gastro-enteritis associated with ingestion of lobster and crabs was reported throughout the State. Culturing revealed no organism of the dysentery, typhoid-paratyphoid group. Investigation revealed undesirable procedures in handling of shell fish in some establishments, but there was no reason to believe that these were responsible for spread of the causative agents.

August–September. Diarrhea in Infants; New Bedford. An outbreak of diarrhea among infants in the Maternity Ward of St. Luke's Hospital, New Bedford, was investigated. The causative organism was not found in the stools of two infants who were still ill. 11 cases, 4 deaths.

September. Bacillary Dysentery; Danvers. A family outbreak of bacillary dysentery occurred in Danvers. 4 cases, 2 deaths.

November. Gastro-enteritis; Williams College, Williamstown. An outbreak of gastro-enteritis occurred among students and faculty at Williams College. In spite of cultural work and epidemiological investigations conducted by the college medical staff, the cause could not be determined.

November. Bacillary Dysentery. Outbreaks of dysentery have occurred in children's wards of several widely separated institutions. Twenty-six cases of Sonne dysentery were reported from the Convalescent Home, Children's Hospital, in Wellesley, 11 from the Cambridge City Hospital. Ten cases of Flexner dysentery occurred at the Fall River General Hospital. Five cases were reported from the Worcester City Hospital; the outbreak was attributed to a child which had been admitted with diarrheal symptoms. Investigation revealed that the father of this patient was a carrier. No deaths resulted from any of these outbreaks.

November. Typhoid Fever; Stoughton. An outbreak of typhoid fever in Stoughton occurred following a banquet of a Lithuanian Society. Cases arose mainly in food handlers and their families. A carrier was discovered in one of the women who helped prepare and serve the meal. 15 cases, 3 deaths.

December. Diphtheria; Chelmsford. Three fatal cases of diphtheria occurred in Chelmsford, two in a single family. The mother and an infant died. The third death occurred in a family where an older child which had been immunized at school escaped infection.

Milk

The past year has again been characterized by the fact that no outbreaks of milk-borne typhoid, scarlet fever, or septic sore throat have occurred. On the other hand, the number of cases of undulant fever discovered continues at a high level. As noted above, the majority of these cases developed in individuals who are known to have constantly used raw milk.

During the year the number of communities requiring pasteurization or certification of all milk sold locally has increased from 32 to 37. This regulation has become effective during the year in Greenfield, Haverhill, Pittsfield, Springfield, and Worcester. These 37 communities have a combined population of 2,787,559 which represents 64 per cent of the population of the State. In addition, five other communities have passed regulations which will take effect during 1938. These are Chicopee, Concord, Fitchburg, Medford, and Needham. As the year ends, Hudson and Lincoln are seriously considering passing the same regulation, and a number of additional communities are making plans to pass such a regulation as soon as public opinion can be developed to back up the enforcement.

The reasonableness of the regulation passed by the Board of Health of Pittsfield has been confirmed by a decision of the Superior Court. Since this decision, several communities which were deferring action until after the case came to trial have begun putting their regulations into effect.

District Health Units

There has been no increase in the size of the Berkshire Health Unit during the present year. Considerable opposition has developed to making the Unit county-wide, and there is some question as to whether a bill establishing a county unit will receive support from a sufficient group of the citizens of the county to insure its passing the Legislature.

There has been no increase in the number of towns participating in the Nashoba Unit during this year. Pepperell withdrew from the Unit and Berlin was added. While there is some sentiment in two of the towns to join in the near future, no definite move has yet been made. During the year, the building to serve as Unit headquarters has been completed and affords a very adequate center for its activities. The building was very substantially built and splendidly furnished. It has served as a meeting place for a number of important organizations and provides a sufficient space for central headquarters for the public health nurses attached to the Unit. This building is the gift of the Commonwealth Fund of New York City through whose generosity both the Nashoba and Berkshire Units were originally organized.

In Barnstable County the milk laboratory has continued to serve the area and the expense of the laboratory, as well as of additional nursing service, has been borne by funds from the U. S. Public Health Service grant.

The plan to organize a Franklin County Unit made very little progress during the year. No additional towns voted to contribute to the support of the Unit. Only six towns, with a population of 3,300, have signified a willingness to make such contributions. However, sixteen of the twenty-six cities and towns officially designated the District Health Officer and the Milk Inspector to act for them as agents.

Interest is growing in Hampshire County in the establishment of a county unit. The recent retirement of the Agent of the Board of Health of Northampton makes this an opportune time to consider the formation of a unit in this area. Several of the towns have shown an interest in such a development and it is hoped that during the next few months something definite may be developed.

District Health Officers

There have been no changes made in district lines during the present year with the exception of transferring the towns of Melrose and Stoneham from the North Metropolitan District into the Northeastern District. Doctor Harold W. Stevens was appointed District Health Officer of Berkshire County and continues to act as Health Officer of the Berkshire Health Unit.

The Division has suffered a considerable loss during the year by the death of

Doctor Charles B. Mack, whose knowledge of local conditions in the cities and towns of the North Metropolitan District had made it possible for him to render valuable service in this area. The position remained unfilled until the end of the school year when Doctor Charles E. Gill was appointed. He had been with the Division of Tuberculosis for several years and had just completed a year at the Harvard School of Public Health.

Board of Health Records

The program of improving local board of health records was continued during the past year. Miss Helen M. Smith made visits during the year to the following communities:

Chatham	Greenfield	Orleans	Somerville
Cohasset	Harwich	Provincetown	Springfield
Dedham	Milford	Sandwich	Wellfleet
Falmouth	North Andover	Saugus	Worcester
Framingham			

This does not include visits made to the central offices of the Barnstable, Berkshire, Franklin County, and Nashoba Units. Communities are beginning to request Miss Smith's assistance, which is good evidence of the fact that they have found her visits valuable. This work is being made possible by the employment of a statistical clerk from funds from the U. S. Public Health Service grant. This relieves Miss Smith of certain of her routine duties and allows her to go into the field.

Clinics and Dispensaries

The licensing of clinics and dispensaries has continued on the same basis as in previous years. Attention has been called from time to time to certain unsatisfactory features of this matter. It would probably be possible to tighten up the regulations which have been in force for a number of years so that certain clinics operating under low standards might be forced to raise their standards or go out of existence. This is a matter which will receive consideration during the coming year.

Bacteriological Laboratory

The total quantity of work in the Bacteriological Laboratory was increased a great deal during the past year because of the large number of specimens examined in connection with the three paratyphoid outbreaks, the search for a carrier in the Grafton State Hospital, and the examination of food handlers in Simmons College, Mt. Holyoke College, and Williams College. Specimens from several outbreaks of dysentery also added to the load. There has been a considerable increase in the number of pneumonia specimens submitted and in the number of smears for gonorrhea.

It is practically impossible to compare the figures for the laboratory work for 1937 with previous years due to the fact that the counting of specimens and of laboratory examinations has been changed to conform with the plan outlined by the American Public Health Association, which differs materially from the plan which has been in effect for previous years. During the year, 43,194 specimens were received and 77,530 examinations were made upon them.

Certain comments should be recorded in regard to present procedures employed in making examinations:

Pneumococcus Type Differentiation. Specimens of sputum are examined directly for the thirty types of pneumococci for which rabbit typing sera are available. If the type cannot be determined within an hour by this method, the specimen is inoculated into a modified Avery broth and the culture examined after 4–6 and 16–18 hours by the Neufeld method. Frequently an intermediate examination after 8–12 hours is made also.

Blood Culture. Since examination of blood cultures is important in evaluating serum therapy in pneumonia, a special blood culture outfit has been devised. This is sent with the therapeutic serum to the physician with the request that it be returned to the laboratory immediately for examination.

Dysentery and Related Bacilli. Comparative tests of various media used for the isolation of dysentery and paradysentery bacilli from stool specimens have been made. Judgment as to the medium of choice is reserved until further work has been done. Endo's medium, prepared immediately before use, appeared to be very satisfactory for the isolation of Shigella paradysenteriae Hiss Y, Shiga, and paradysenteriae Sonne, which were the prevalent strains during the past year. The presence of B. alkalescens is noted, although usually not reported.

Staphylococci. Staphylococci isolated from a variety of lesions and from food suspected of causing food poisoning outbreaks have been studied for their cultural characters on special media such as crystal violet agar and Stone's gelatin agar, and for the production of coagulase and hemolysin.

Cultivation of Tubercle Bacilli. After a study of the results of cultural methods used in the examination of approximately 1,000 specimens received at the laboratory during the last few years, the following technique has been adopted. After appropriate preparatory treatment, the specimen is seeded onto a series of tubes of Petragnani's and Corper's media which are incubated at 37 C. Cultures are examined weekly for visible colonies and if found to be acid-fast by microscopic examination, a guinea-pig is inoculated with a suspension of the growth for a confirmatory test. If no growth, either macro- or microscopic of acid-fast bacilli is obtained after eight weeks' incubation, the culture is reported as negative.

Paratyphoid Cultures. Bismuth Sulphite Agar which was added as a routine medium for typhoid cultures in 1936 was found very satisfactory for paratyphoid cultures in the outbreaks of the past year. Bacilli were isolated from 225 individuals during the outbreaks.

Hours of Service.

The twenty-four hour service that was instituted in 1935 has been continued throughout the year. A bacteriologist is on call throughout the night primarily for pneumonia service.

Educational Activities.

Continuing the practice of several years, technicians from certain hospitals in the State have been invited to visit the laboratory for practice in pneumococcus typing. During the past year, twenty-three technicians have been given this training with an average length of stay for each of two days. Three students from the Graduate School of Simmons College have spent several weeks in the laboratory for general training and visitors from other states and foreign countries have spent a few days. Groups of students from schools and hospitals in and around Boston have been given special lectures on the diagnostic work of the laboratory.

Public Health Education

Representatives of the Division gave 123 talks reaching 10,028 individuals during the year. In addition to this, ten radio broadcasts were given by various members of the Division. Three papers were read by members of the staff at out-of-state meetings.

Table I.—*Anterior Poliomyelitis*

Year	Cases	Case Rate per 100,000	Deaths	Death Rate per 100,000	Fatality Rate (Per Cent)
1933	353	8.2	32	0.7	9.1
1934	76	1.8	9	0.2	11.8
1935	1,390	31.9	61	1.4	4.4
1936	51	1.2	8	0.2	15.7
1937	351	8.0	22	0.5	6.3

Table II.—*Diphtheria*

1933	1,041	24.1	86	2.0	8.3
1934	629	14.5	50	1.2	7.9
1935	390	8.9	26	0.6	6.7
1936	307	7.0	27	0.6	8.8
1937	175	4.0	18	0.4	10.3

TABLE III.—*Lobar Pneumonia*

Year	Cases	Case Rate per 100,000	Deaths	Death Rate per 100,000	Fatality Rate (Per Cent)
1933	4,277	99.0	1,825	42.3	42.7
1934	3,976	91.6	1,601	36.9	40.3
1935	4,370	100.2	1,731	39.7	39.6
1936	5,459	124.6	1,944	44.4	35.6
1937	5,322	120.8	1,846	41.9	34.7

TABLE IV. — *Measles*

1933	15,067	348.9	27	0.6	0.2
1934	44,817	1,032.6	91	2.1	0.2
1935	12,352	283.2	37	0.8	0.3
1936	28,111	641.4	35	0.8	0.1
1937	21,136	479.9	28	0.6	0.1

TABLE V.—*Meningococcus Meningitis*

1933	50	1.2	25	0.6	50.0
1934	66	1.5	28	0.6	42.4
1935	83	1.9	55	1.3	66.3
1936	191	4.4	100	2.3	52.4
1937	166	3.8	72	1.6	43.4

TABLE VI. — *Scarlet Fever*

1933	12,284	284.5	108	2.5	0.9
1934	8,391	193.4	76	1.8	0.9
1935	8,304	190.4	57	1.3	0.7
1936	8,774	200.2	44	1.0	0.5
1937	8,480	192.5	38	0.9	0.4

TABLE VII. — *Tuberculosis, Pulmonary*

1933	3,541	82.0	2,059	47.7
1934	3,585	82.6	1,902	43.8
1935	3,592	82.4	1,813	41.6
1936	3,207	73.2	1,733	39.5
1937	3,534	80.2	1,761	40.0

TABLE VIII. — *Tuberculosis, Non-Pulmonary*

1933	466	10.8	222	5.1
1934	448	10.3	214	4.9
1935	387	8.9	148	3.4
1936	401	9.1	165	3.8
1937	363	8.2	126	2.9

TABLE IX. — *Typhoid Fever*

1933	162	3.8	22	0.5	13.6
1934	134	3.1	13	0.3	9.7
1935	112	2.6	10	0.2	8.9
1936	135	3.1	10	0.2	7.4
1937	114	2.6	13	0.3	11.4

TABLE X. — *Whooping Cough*

1933	9,834	227.7	97	2.2	1.0
1934	12,659	291.7	125	2.9	1.0
1935	5,566	127.6	67	1.5	1.2
1936	7,219	164.7	52	1.2	0.7
1937	13,333	302.7	95	2.1	0.7

TABLE XI.—*Number and Kind of Examinations*

	1933	*1934*	*1935*	*1936*	*1937*
Diphtheria	8,822	9,587	6,330	5,575	6,104
Gonorrhea	9,019	9,683	10,741	11,714	13,621
Malaria	53	52	53	62	48
Pneumonia	1,314	1,257	1,665	1,446	1,950
Tuberculosis	5,037	5,466	5,773	5,631	5,186
Typhoid Fever:					
Widal	2,237	2,142	2,866	3,429	3,713
Culture	3,860	6,047	6,378	5,766	9,268
Undulant Fever	374	457	742	1,105	1,393
Miscellaneous	2,766	3,108	3,716	3,594	1,911
Total	33,482	37,799	38,264	38,322	43,194*

*This figure represents the actual number of specimens; the figures for previous years are for the number of examinations counted in a different way than in Table XII.

TABLE XII.—*Specimens and Examinations for 1937*

	Positive	Negative	Total Number of Specimens	Total Number of Examinations
Diphtheria:				
Diagnosis	73	5,240	5,313	10,464**
Release	222	569	791	791
Gonorrhea	2,296	11,325	13,621	27,242 [1]
Malaria	1	47	48	48
Meningococci, Spinal fluid for	16	87	103	103
Pneumonia:				
Pneumococci found and typed	–	–	1,004	1,004
Pneumococci not found	–	–	946	946
Tuberculosis:				
Sputum	806	3,934	4,740	4,740
Urine, spinal fluid, etc. (Culture and animal inoculations)	45	401	446	446
Typhoid Fever:				
Widal	239	3,474*	3,713	8,632***
Culture (blood, feces, urine, etc.)	275	8,993	9,268	17,109****
Undulant fever	68	1,325	1,393	4,140 [2]
Miscellaneous:				
Diphtheria virulence tests	9	2	11	11
Dysentery agglutination tests	–	150	150	150
Dysentery, Amoebic	2	93	95	95
Vincent's angina (Sent by dentists)	395	166	561	561
Weil-Felix reaction for typhus fever	2	82	84	84
Unclassified	–	–	907	964 [3]
Total			43,194	77,530

*Includes 300 atypical.
**Includes examinations for hemolytic streptococci and the organisms of Vincent's angina.
***Includes examinations for paratyphoid A and B agglutination tests as follows:

Paratyphoid B positive —	178
Negative A and B —	4,741
Total —	4,919

****Includes 7,841 examinations for paratypoid and dysentery bacilli.

[1] Includes examinations for average number of leucocytes per field.
[2] Includes examinations for agglutinins for typhoid and paratyphoid A and B.
[3] Includes miscellaneous specimens for identification of organisms.

TABLE XIII.—*Pneumococcus Type Differentiation*

Type	Number	Per Cent*	Type	Number	Per Cent*
I	201	20.1	XIX	41	4.1
II	49	4.9	XX	20	2.0
III	120	12.0	XXI	6	0.6
IV	50	5.0	XXII	8	0.8
V	77	7.7	XXIII	18	1.8
VI	32	3.2	XXIV	9	.9
VII	68	6.8	XXV	3	.3
VIII	106	10.6	XXVII	1	.1
IX	19	1.9	XXVIII	6	.6
X	5	0.5	XXIX	20	2.0
XI	18	1.8	XXXI	2	.2
XII	5	0.5	XXXII	2	.2
XIII	9	0.9	Group IV	3	.3
XIV	23	2.3			
XV	14	1.4		1,004	100.4
XVI	16	1.6	No pneumococci	946	
XVII	26	2.6			
XVIII	27	2.7	Total	1,950	

*Per cent of each type found among sputa containing pneumococci.

TABLE XIV. — *Laboratory Examinations for Rabies**

YEARS	Positive		Negative	Total Animals Examined
	Dogs	Other Animals		
1933	139	5	153	301
1934	242	9	234	497
1935	187	16	232	491
1936	105	4	224	335
1937	158	6	247	460

*Wassermann Laboratory

Cases and Deaths, with Case and Death Rates per 100,000 Population for Reportable Diseases During the Year 1937*

Diseases	Cases	Case Rate per 100,000 Population	Deaths	Death Rate per 100,000 Population	Fatality Rate (PerCent)
Actinomycosis	–	–	1	–**	–***
Anterior Poliomyelitis	351	8.0	22	0.5	6.3
Anthrax	6	0.1	–	–	–
Chicken Pox	12,840	291.5	8	0.2	0.1
Diphtheria	175	4.0	18	0.4	10.3
Dog Bite	10,538	239.3	–	–	–
Dysentery, Amebic	3	0.1	2	–**	66.7
Dysentery, Bacillary	99	2.2	4	0.1	4.0
Encephalitis Lethargica	19	0.4	14	0.3	73.7
German Measles	1,070	24.3	–	–	–
Gonorrhea	5,856	132.9	13	0.3	2.2
Hookworm	–	–	–	–	–
Leprosy	1	–**	–	–	–
Lobar Pneumonia	5,322	120.8	1,846	41.9	34.7
Malaria	15	0.3	2	–**	13.3
Measles	21,136	479.9	28	0.6	0.1
Meningococcus Meningitis	166	3.8	72	1.6	43.4
Mumps	5,504	125.0	–	–	–
Ophthalmia Neonatorum	1,069	24.3	–	–	–
Paratyphoid A	1	–**	–	–	–
Paratyphoid B	267	6.1	2	–**	0.7
Pellagra	11	0.2	13	–**	–***
Pfeiffer Bacillus Meningitis	3	0.1	3	0.1	100.0
Rabies	–	–	–	–	–
Scarlet Fever	8,480	192.5	38	0.9	0.4
Septic Sore Throat	195	4.4	42	0.9	21.5
Smallpox	–	–	–	–	–
Syphilis	6,207	140.9	208	4.7	3.4
Tetanus	17	.4	13	0.3	76.5
Trachoma	22	.5	–	–	–
Trichinosis	21	.5	1	–**	4.8
Tuberculosis, Pulmonary	3,534	80.2	1,761	40.0	49.8
Tuberculosis, Other Forms	363	8.2	126	2.9	34.7
Tuberculosis, Hilum	609	13.8	–	–	–
Typhoid Fever	114	2.6	13	0.3	11.4
Typhus Fever	1	–**	–	–	–
Undulant Fever	43	1.0	2	–**	4.6
Whooping Cough	13,333	302.7	95	2.1	0.7
	97,391	2,211.3	4,347	98.7	

*Population 4,404,200.
**Less than .05.
***Inadequately reported.

Cases and Deaths for all Reportable Diseases by Months—1937

	Jan		Feb.		March		April		May		June		July		August		Sep-tember		October		No-vember		De-cember		Total	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
Actinomycosis	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1
Anterior Poliomyelitis	1	–	–	–	–	–	–	–	1	–	6	1	30	1	146	11	141	6	19	–	6	3	1	–	351	22
Anthrax	–	–	–	–	–	–	2	–	1	–	2	–	1	–	–	–	–	–	–	–	–	–	–	–	6	–
Chicken Pox	1772	–	1438	1	1471	3	1493	1	1579	1	1511	1	470	–	105	–	67	–	291	–	973	–	1670	1	12840	8
Diphtheria	20	3	17	3	12	–	11	3	21	–	15	1	25	1	17	–	7	–	4	1	8	1	18	5	175	18
Dog Bite	580	–	569	–	762	–	990	–	1223	–	1338	–	1193	–	1068	–	918	–	729	–	598	–	570	–	10538	–
Dysentery, Amebic	1	–	–	1	–	–	–	–	1	–	–	–	–	–	–	–	–	1	–	–	–	–	1	–	3	2
Dysentery, Bacillary	–	1	4	–	1	–	–	–	1	–	1	–	3	–	20	1	9	–	4	–	37	2	19	–	99	4
Encephalitis Lethargica	3	1	5	5	–	1	–	–	–	–	1	–	2	2	2	2	1	1	1	–	3	2	1	–	19	14
German Measles	76	–	77	–	105	–	157	–	259	–	153	–	60	–	26	–	22	–	24	–	39	–	72	–	1070	–
Gonorrhea	519	2	429	–	462	1	453	1	486	1	472	2	506	–	490	1	510	2	445	1	589	–	495	2	5856	13
Hookworm	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Leprosy	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	1	–
Lobar Pneumonia	843	312	964	367	790	250	646	236	434	143	247	74	183	55	120	31	107	46	308	117	269	82	411	133	5322	1846
Malaria	–	–	1	–	–	1	1	–	–	–	–	–	3	–	6	–	3	–	1	–	–	–	–	1	15	2
Measles	4024	3	3502	6	3774	5	2983	6	2953	4	2356	4	672	–	108	–	45	–	88	–	282	–	349	–	21136	23
Meningococcus Men.	13	6	15	8	31	15	30	16	31	9	13	2	5	2	11	6	2	–	6	3	5	3	4	2	166	72
Mumps	719	–	735	–	971	–	785	–	747	–	463	–	171	–	95	–	100	–	154	–	266	–	298	–	5504	–
Ophthalmia Neonatorum	69	–	81	–	111	–	120	–	96	–	91	–	82	–	82	–	74	–	89	–	101	–	73	–	1069	–
Paratyphoid A	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	1	–
Paratyphoid B	–	–	2	–	–	–	34	1	81	–	50	–	28	–	35	1	26	–	1	–	6	–	4	–	267	2
Pellagra	–	1	2	1	–	1	1	3	2	1	2	4	–	–	–	1	4	1	–	–	–	–	–	–	11	13
Pfeiffer Bacillus	–	–	–	–	–	–	–	–	1	1	–	–	1	1	–	–	–	–	–	–	–	–	1	1	3	3
Rabies	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Scarlet Fever	991	6	1002	4	1184	3	1172	11	976	4	723	3	261	1	111	–	168	2	372	1	594	2	926	1	8480	38
Septic Sore Throat	14	7	44	9	22	3	22	5	26	6	8	2	10	1	7	3	6	2	15	–	8	3	13	1	195	42
Smallpox	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Syphilis	510	13	509	19	657	13	560	27	534	11	511	15	514	18	528	9	427	16	424	27	558	13	475	27	6207	208
Tetanus	–	–	–	–	–	–	3	1	–	1	3	3	4	3	–	–	5	3	1	–	–	2	1	–	17	13
Trachoma	1	–	4	–	4	–	3	–	–	–	1	–	1	–	3	–	–	–	1	–	2	–	2	–	22	–
Trichinosis	1	–	2	–	4	1	2	–	–	–	1	–	1	–	3	–	1	–	3	–	2	–	1	–	21	1
Tuberculosis, Pulmonary	295	149	252	130	295	150	339	168	267	169	316	161	392	144	289	143	280	109	243	148	225	159	341	131	3534	1761
Tuberculosis, Other Forms	26	14	21	12	44	12	30	8	20	8	36	16	34	8	36	16	23	6	27	8	24	9	42	9	363	126
Tuberculosis, Hilum	69	–	42	–	61	–	56	–	53	–	38	–	71	–	46	–	40	–	40	–	42	–	51	–	609	–
Typhoid Fever	3	–	3	1	9	1	4	–	4	2	6	–	13	1	11	2	16	1	11	–	15	–	19	5	114	13
Typhus Fever	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–
Undulant Fever	5	–	1	–	–	–	3	1	1	–	5	–	3	–	3	1	3	–	9	–	2	–	8	–	43	2
Whooping Cough	2167	6	1831	17	2013	14	1421	4	1220	8	998	12	787	3	688	4	585	9	420	5	471	2	732	11	13333	95
Total	12722	524	11552	584	12783	474	11321	492	11019	370	9367	301	5526	241	4056	232	3591	205	3730	311	5125	283	6599	330	97391	4347

Cases of Reportable Diseases by Ages for 1937

Disease	Under 1 Year	1 year	2 years	3 years	4 years	5 years	6 years	7 years	8 years	9 years	10 to 14 years	15 to 19 years	20 to 24 years	25 to 29 years	30 to 34 years	35 to 44 years	45 to 54 years	55 to 64 years	65 to 74 years	75 years and over	Age Unknown	Total	Male	Female	Unknown
Anterior Poliomyelitis	3	9	24	23	15	26	31	20	22	17	85	40	10	13	10	3	–	–	–	–	–	351	213	138	–
Chicken Pox	336	455	653	762	898	1591	2345	1686	1169	680	1302	215	73	43	36	27	3	4	2	–	560	12840	6586	6140	114
Diphtheria	8	13	12	20	11	12	13	11	9	4	19	6	10	7	7	9	2	–	2	–	–	175	87	88	–
Dysentery, Amebic	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	1	1	–	–	–	–	3	2	1	–
Dysentry, Bacillary	4	1	4	11	3	4	6	7	2	3	8	5	5	7	1	–	–	–	–	–	28	99	57	42	–
German Measles	50	79	72	47	59	84	112	141	79	57	172	44	22	9	2	8	3	–	1	–	29	1070	538	532	–
Gonorrhea	39	10	12	15	9	11	14	15	12	16	35	470	1739	1360	816	817	302	93	19	5	47	5856	4419	1437	–
Leprosy	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	1	1	–	–
Lobar Pneumonia	136	131	125	112	106	108	136	110	85	73	260	258	212	238	319	699	686	617	451	232	228	5322	3158	2164	–
Malaria	–	–	–	–	–	1	–	–	–	–	1	1	3	–	2	3	2	1	1	–	–	15	10	5	–
Measles	389	896	1293	1426	1792	2260	3749	3068	2156	1058	1677	322	89	63	58	44	15	3	7	1	770	21136	10894	10101	141
Meningococcus Meningitis	13	11	7	10	7	2	4	1	4	1	14	21	9	10	10	18	13	7	2	2	–	166	113	53	–
Mumps	15	63	124	162	231	393	649	645	603	420	1152	370	110	80	70	96	31	7	2	3	278	5504	2897	2572	35
Paratyphoid Fever	–	1	5	5	3	4	6	6	10	7	34	43	43	25	22	20	21	9	4	–	–	268	85	183	–
Pellagra	–	–	–	–	–	–	–	–	–	–	–	–	1	1	2	1	1	1	2	1	1	11	9	2	–
Scarlet Fever	39	142	368	526	713	819	989	852	587	517	1572	456	195	162	107	133	47	15	6	1	234	8480	4250	4190	40
Septic Sore Throat	–	2	2	1	–	1	5	3	3	2	12	45	23	15	20	26	13	12	3	1	6	195	98	97	–
Smallpox	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Syphilis	40	4	5	6	9	13	8	10	12	13	57	173	625	682	618	1398	1341	789	311	51	42	6207	3483	2724	–
Trachoma	–	–	–	–	–	–	–	–	–	–	1	1	–	2	2	2	5	4	–	1	4	22	9	13	–
Tuberculosis, Pulmonary	8	13	5	6	11	7	5	10	10	12	93	253	406	398	308	636	518	323	170	39	303	3534	2043	1491	–
Tuberculosis, Other Forms	6	12	6	5	7	6	5	3	6	9	23	40	38	41	23	35	41	19	7	5	26	363	183	180	–
Typhoid Fever	–	–	–	3	4	3	2	1	3	3	13	12	6	16	8	16	16	6	1	1	–	114	64	50	–
Typhus Fever	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	1	1	–	–
Undulant Fever	–	–	–	–	–	–	–	–	2	–	2	–	2	4	8	6	8	3	2	1	5	43	31	12	–
Whooping Cough	940	997	1257	1377	1436	1589	1851	1375	775	378	562	55	16	30	21	29	8	5	4	2	626	13333	6392	6790	151

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Somerville	10
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Southampton	283
Southborough	215
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Spencer	113
Springfield	4
Sterling	242
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Stoneham	69
Stoughton	84
Stow	267
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Sudbury	227
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West Stockbridge	272
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Whitman	97
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Williamstown	132
Wilmington	128
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Winthrop	49
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Line No.	Cities and Towns in Order of Population	Population estimated as of July 1, 1937	Anterior Poliomyelitis		Chicken Pox		Diphtheria		Dog Bite		German Measles		Gonorrhea	
			Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
1	Massachusetts	4,404,220	251	22	12840	8	175	18	10538	-	1070	-	5856	13
	Cities of over 500,000													
2	Boston	836,939	51	-	3128	1	29	3	3202	-	124	-	2116	2
	Cities of over 150,000													
3	Worcester	187,962	9	1	827	-	6	-	593	-	239	-	163	-
	Cities of 100,000-150,000	*697,379*	*31*	*3*	*2258*	*5*	*39*	*6*	*1634*	-	*146*	-	*1185*	*3*
4	Springfield	149,507	6	-	527	1	-	-	307	-	36	-	240	2
5	Cambridge	120,407	3	-	698	-	3	-	528	-	26	-	179	-
6	Fall River	118,542	2	-	345	3	15	5	147	-	30	-	151	1
7	New Bedford	108,689	4	-	216	1	12	1	89	-	19	-	187	-
8	Lynn	100,174	14	1	405	-	6	-	374	-	32	-	166	-
9	Lowell	100,060	2	2	67	-	3	-	189	-	3	-	162	-
	Cities and Towns of 50,000–100,000	*621,611*	*44*	*4*	*1528*	-	*16*	*2*	*1354*	-	*92*	-	*570*	*1*
10	Somerville	99,145	11	-	136	-	4	-	153	-	3	-	97	-
11	Lawrence	87,692	-	-	50	-	2	1	174	-	7	-	95	-
12	Quincy	79,500	11	2	411	-	-	-	151	-	13	-	58	-
13	Newton	66,599	7	1	289	-	1	-	189	-	14	-	49	-
14	Medford	62,353	4	-	193	-	1	-	220	-	22	-	63	-
15	Brockton	61,684	2	-	223	-	6	1	101	-	12	-	49	-
16	Malden	56,889	7	1	87	-	2	-	185	-	4	-	65	1
17	Holyoke	55,942	-	-	36	-	-	-	86	-	1	-	44	-
18	Brookline	51,807	2	-	103	-	-	-	95	-	16	-	50	-
	Cities and Towns of 25,000-50,000	*553,354*	*57*	*2*	*1333*	*1*	*25*	*2*	*1289*	-	*92*	-	*624*	*3*
19	Haverhill	49,939	10	-	228	1	-	-	115	-	21	-	102	1
20	Everett	46,606	2	-	17	-	1	-	92	-	1	-	54	-
21	Pittsfield	46,382	11	-	40	-	-	-	56	-	3	-	55	1
22	Salem	43,535	5	-	46	-	5	1	118	-	1	-	44	-
23	Fitchburg	42,230	3	-	25	-	5	1	22	-	7	-	21	-
24	Waltham	41,247	2	-	61	-	1	-	75	-	2	-	22	-
25	Chelsea	41,018	2	-	28	-	5	-	144	-	5	-	41	-
26	Chicopee	40,918	1	-	40	-	1	-	57	-	1	-	39	-
27	Arlington	39,825	2	-	255	-	1	-	150	-	12	-	25	1
28	Taunton	37,470	-	-	17	-	2	-	9	-	-	-	55	-
29	Watertown	36,307	3	-	154	-	1	-	130	-	7	-	49	-
30	Revere	35,138	4	2	65	-	3	-	117	-	11	-	63	-
31	Belmont	26,454	-	-	318	-	-	-	125	-	17	-	18	-
32	Beverly	26,285	12	-	39	-	-	-	79	-	4	-	36	-
	Cities and Towns of 10,000-25,000	*742,008*	*76*	*9*	*1787*	*1*	*30*	*1*	*1632*	-	*167*	-	*623*	*2*
33	Melrose	24,826	4	-	24	-	2	-	45	-	-	-	25	-
34	Northampton	24,600	-	-	139	-	-	-	24	-	20	-	26	1
35	Gloucester	24,144	4	-	24	-	-	-	79	-	1	-	23	-
36	Framingham	22,881	1	-	68	-	1	-	84	-	1	-	25	1
37	Peabody	22,468	3	2	16	-	7	1	65	-	2	-	34	-
38	North Adams	22,328	4	-	2	-	-	-	16	-	1	-	15	-
39	Weymouth	22,203	2	-	8	-	-	-	41	-	-	-	11	-
40	Leominster	21,939	1	1	46	-	-	-	40	-	7	-	8	-
41	Attleboro	21,870	1	-	68	-	1	-	67	-	16	-	11	-
42	Methuen	21,075	-	1	28	-	-	-	45	-	-	-	8	-
43	Gardner	20,922	-	-	15	-	2	-	41	-	1	-	24	-
44	Woburn	19,833	-	-	10	-	-	-	26	-	2	-	14	-
45	Milton	19,050	2	-	113	-	1	-	50	-	4	-	10	-
46	Westfield	18,274	-	-	23	-	-	-	29	-	1	-	24	-
47	Braintree	17,866	5	1	36	-	-	-	49	-	-	-	8	-
48	West Springfield	17,346	1	-	1	-	-	-	-	-	-	-	20	-
49	Winthrop	17,079	-	-	94	-	2	-	75	-	10	-	9	-
50	Wakefield	16,587	1	-	7	-	-	-	37	-	-	-	10	-
51	Southbridge	16,586	-	-	33	-	4	-	4	-	16	-	12	-
52	Greenfield	16,115	2	-	31	-	-	-	31	-	3	-	31	-
53	Marlboro	15,882	-	-	28	-	-	-	-	-	-	-	8	-
54	Norwood	15,849	1	-	10	1	-	-	6	-	-	-	17	-
55	Dedham	15,493	1	-	1	-	3	-	5	-	-	-	18	-
56	Saugus	15,273	1	-	25	-	-	-	75	-	5	-	16	-
57	Milford	15,148	1	-	-	-	-	-	-	-	-	-	13	-
58	Natick	14,817	1	-	69	-	-	-	65	-	2	-	20	-
59	Newburyport	14,678	14	2	76	-	1	-	33	-	4	-	9	-
60	Wellesley	14,296	-	-	133	-	-	-	60	-	5	-	9	-
61	Danvers	14,373	5	-	9	-	1	-	14	-	-	-	9	-
62	Webster	14,281	-	-	52	-	-	-	8	-	1	-	4	-
63	Winchester	13,713	1	-	126	-	-	-	73	-	9	-	15	-
64	Plymouth	13,258	-	-	57	-	-	-	29	-	3	-	13	-
65	Adams	12,942	4	-	-	-	-	-	2	-	-	-	5	-

Lobar Pneumonia		Measles		Menin. Meningitis		Mumps		Ophthalmia Neonatorum		Scarlet Fever		Syphilis		Tuberculosis, Pulmonary		Tuberculosis, Other Forms		Typhoid Fever		Whooping Cough		
Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Line No.
5322	1846	21136	28	166	72	5504	–	1069	–	8480	38	6207	208	3534	1761	363	126	114	13	13333	95	1
1554	445	1078	1	46	26	793	–	626	–	1850	5	2522	52	1009	432	84	25	10	–	2956	18	2
370	106	2397	4	5	3	192	–	25	–	194	2	200	7	169	94	23	11	7	–	799	3	3
758	*248*	*3616*	*4*	*19*	*10*	*483*	–	*181*	–	*1015*	*4*	*1023*	*42*	*625*	*296*	*75*	*21*	*17*	*2*	*2824*	*16*	
130	50	337	1	6	3	41	–	58	–	221	–	301	16	111	52	5	4	3	–	588	1	4
185	45	128	–	6	3	279	–	13	–	328	2	205	7	117	51	22	2	3	1	661	3	5
152	48	732	2	3	2	11	–	69	–	84	–	104	4	106	62	4	3	1	–	544	4	6
105	26	567	–	2	1	21	–	29	–	91	1	156	8	134	67	23	5	5	–	161	2	7
131	46	1795	1	–	–	119	–	8	–	219	1	143	6	72	31	10	3	3	–	843	2	8
55	33	57	–	2	1	12	–	4	–	72	–	114	1	85	33	11	4	2	1	27	4	9
782	*240*	*2561*	*4*	*17*	*10*	*932*	–	*170*	–	*1302*	*4*	*655*	*16*	*441*	*181*	*60*	*11*	*23*	*2*	*1785*	*7*	
117	28	128	1	1	–	14	–	6	–	148	–	115	3	78	31	10	1	5	–	115	–	10
55	33	848	2	–	–	3	–	4	–	178	3	130	3	73	28	14	1	–	–	55	–	11
106	32	320	–	7	1	44	–	1	–	393	–	64	2	66	32	2	–	4	–	242	–	12
84	25	107	–	3	2	304	–	4	–	135	–	55	2	36	13	6	2	1	–	494	1	13
132	36	616	1	3	3	52	–	4	–	159	1	76	–	33	13	9	3	5	2	233	–	14
91	24	9	–	1	–	374	–	146	–	72	–	63	2	29	12	3	–	3	–	279	1	15
65	27	480	–	2	3	13	–	4	–	73	–	69	1	58	22	7	2	–	–	115	4	16
87	17	22	–	–	–	61	–	1	–	40	–	25	2	41	18	2	–	5	–	88	1	17
45	18	31	–	–	1	67	–	–	–	104	–	58	1	27	12	7	2	–	–	164	–	18
663	*214*	*2026*	*2*	*26*	*8*	*601*	–	*14*	–	*1336*	*9*	*644*	*24*	*418*	*192*	*46*	*14*	*11*	*1*	*976*	*13*	
74	13	297	1	–	–	8	–	–	–	127	1	85	2	27	14	4	2	–	–	37	1	19
78	26	92	–	4	1	6	–	2	–	126	–	80	1	35	14	5	1	–	–	95	1	20
33	19	5	–	1	–	4	–	–	–	446	6	49	4	20	12	4	2	2	–	42	2	21
53	16	258	–	–	–	47	–	2	–	43	–	36	2	29	11	8	1	–	–	27	4	22
48	14	135	–	4	1	2	–	1	–	28	–	26	1	53	13	3	3	1	1	31	1	23
33	9	23	–	3	3	31	–	–	–	106	1	46	1	42	34	4	1	–	–	76	1	24
72	21	101	–	1	–	3	–	2	–	53	1	89	7	41	13	3	1	2	–	28	–	25
44	13	2	–	9	2	12	–	1	–	20	–	31	1	39	15	2	1	2	–	33	1	26
33	18	197	–	1	–	374	–	–	–	52	–	24	–	36	13	3	–	–	–	252	–	27
10	17	12	–	–	–	6	–	1	–	20	–	34	2	22	22	3	1	1	–	10	–	28
34	17	190	–	–	–	16	–	2	–	170	–	33	3	16	8	3	1	1	–	102	–	29
69	14	169	1	3	1	–	–	1	–	29	–	68	–	13	9	2	–	1	–	41	2	30
21	4	473	–	–	–	79	–	–	–	80	–	23	–	16	6	1	–	1	–	147	–	31
61	13	72	–	–	–	13	–	2	–	36	–	20	–	29	8	1	–	–	–	55	–	32
677	*299*	*5597*	*11*	*24*	*7*	*1457*	–	*24*	–	*1522*	*6*	*615*	*24*	*455*	*235*	*36*	*17*	*12*	*5*	*2225*	*13*	
44	10	326	–	1	–	6	–	2	–	51	–	12	2	9	3	1	–	1	–	38	–	33
33	19	250	–	3	–	9	–	–	–	113	–	15	–	21	27	–	–	2	1	113	–	34
24	11	2	–	–	–	2	–	2	–	11	–	37	–	12	6	1	1	–	–	26	1	35
23	5	191	–	–	–	2	–	–	–	20	–	39	2	15	4	1	1	–	–	71	2	36
17	10	484	–	1	1	25	–	–	–	30	–	21	1	17	9	1	1	–	–	72	–	37
22	6	–	–	–	–	1	–	–	–	16	–	32	6	8	2	–	1	–	–	2	–	38
10	15	4	–	1	–	1	–	–	–	26	1	18	–	21	6	2	–	–	–	11	1	39
17	6	233	1	4	2	1	–	3	–	14	–	29	–	13	6	1	1	–	–	9	–	40
22	8	276	–	–	–	86	–	1	–	128	1	19	–	17	11	3	–	1	–	100	–	41
10	5	488	3	1	–	1	–	–	–	39	–	16	1	13	10	2	–	–	–	48	–	42
29	6	127	1	–	1	13	–	1	–	24	–	16	1	30	11	1	2	–	–	38	–	43
21	12	68	–	1	–	2	–	–	–	36	–	11	1	11	5	–	1	–	–	37	1	44
10	6	26	–	–	–	16	–	1	–	39	–	8	–	6	5	–	–	–	–	24	–	45
28	12	5	–	–	–	2	–	–	–	109	1	23	–	16	9	1	1	–	–	9	1	46
9	4	6	–	–	–	4	–	–	–	30	–	9	–	6	21	1	–	–	–	31	–	47
13	10	3	–	–	–	5	–	–	–	29	–	19	1	13	1	–	–	–	–	1	1	48
15	7	35	–	–	–	328	–	1	–	100	–	8	1	12	5	–	–	1	1	266	–	49
22	5	352	–	–	–	25	–	–	–	44	–	6	–	10	3	3	–	–	–	14	1	50
20	9	50	–	1	–	1	–	–	–	6	–	10	1	15	3	1	–	1	1	33	–	51
19	6	145	–	1	–	8	–	–	–	50	–	24	–	7	2	1	1	–	–	57	1	52
6	7	335	–	–	–	1	–	–	–	21	–	9	–	5	6	–	–	–	–	17	1	53
6	4	–	–	1	1	1	–	–	–	12	–	12	–	8	8	–	–	1	–	4	–	54
10	5	1	–	–	–	5	–	–	–	7	–	9	–	3	2	–	1	–	–	14	–	55
10	5	131	1	–	–	5	–	–	–	91	2	23	1	9	4	2	–	–	–	47	–	56
2	6	–	–	1	–	–	–	–	–	1	–	16	1	2	7	3	1	–	–	1	–	57
38	11	159	–	1	–	143	–	–	–	21	–	21	–	9	4	–	–	–	–	119	–	58
20	8	26	–	–	–	88	–	–	–	3	–	12	1	7	6	2	–	1	–	272	1	59
20	6	30	–	2	–	289	–	–	–	35	–	14	–	4	1	–	–	–	–	89	–	60
13	11	105	–	–	–	18	–	–	–	9	–	6	–	2	9	–	1	1	1	16	1	61
4	1	3	–	–	–	86	–	–	–	26	–	3	1	7	2	1	1	–	–	10	–	62
12	1	327	–	–	–	48	–	1	–	14	–	5	–	10	3	1	–	1	1	68	–	63
5	1	12	–	–	–	–	–	–	–	103	1	5	–	9	2	–	1	–	–	60	–	64
9	2	–	–	–	–	–	–	–	–	9	–	9	–	9	3	–	–	–	–	–	–	65

Line No.	Cities and Towns in Order of Population	Population estimated as of July 1, 1937	Anterior Poliomyelitis		Chicken Pox		Diphtheria		Dog Bite		German Measles		Gonorrhea	
			Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
66	Needham	12,343	–	–	44	–	–	–	64	–	13	–	12	–
67	Clinton	12,142	–	–	–	–	–	–	20	–	–	–	15	–
68	Lexington	11,521	1	–	49	–	3	–	15	–	26	–	15	–
69	Stoneham	11,251	–	–	4	–	–	–	62	–	1	–	12	–
70	Reading	11,194	5	–	14	–	–	–	13	–	–	–	8	–
71	Fairhaven	11,031	1	1	44	–	–	–	26	–	2	–	8	–
72	Northbridge	11,030	–	–	–	–	–	–	–	–	–	–	5	–
73	Marblehead	10,964	4	1	36	–	–	–	90	–	1	–	9	–
74	Andover	10,845	–	–	86	–	–	–	54	–	1	–	3	–
75	Athol	10,790	–	–	13	–	2	–	15	–	–	–	5	–
76	Swampscott	10,549	5	–	116	–	–	–	53	–	7	–	15	–
77	North Attleboro	10,205	–	–	–	–	–	–	1	–	–	–	3	–
78	Easthampton	10,048	–	–	9	–	–	–	1	–	2	–	9	–
	Cities and Towns of 5,000-10,000	*354,054*	*27*	*2*	*889*	–	*7*	*3*	*434*	–	*87*	–	*280*	*1*
79	Amesbury	9,786	4	–	70	–	–	–	16	–	3	–	8	–
80	Dartmouth	9,763	1	1	64	–	–	–	11	–	1	–	14	–
81	Palmer	9,365	–	–	2	–	2	–	3	–	–	–	2	–
82	Bridgewater	9,279	1	–	54	–	–	–	25	–	1	–	7	–
83	Middleboro	9,000	–	–	97	–	–	–	10	–	12	–	8	–
84	Stoughton	8,622	–	–	16	–	–	–	1	–	–	–	5	–
85	Hudson	8,506	–	–	–	–	–	–	–	–	–	–	5	–
86	Barnstable	8,442	1	–	16	–	–	–	33	–	5	–	8	–
87	Ludlow	8,410	–	–	27	–	–	–	1	–	34	–	14	–
88	Randolph	8,120	1	–	–	–	–	–	–	–	–	–	3	–
89	Rockland	8,081	–	–	–	–	–	–	–	–	–	–	2	–
90	Grafton	8,022	–	–	–	–	–	–	–	–	–	–	2	–
91	Montague	7,907	3	1	10	–	–	–	3	–	–	–	1	–
92	Ware	7,907	–	–	–	–	–	–	–	–	–	–	6	–
93	Chelmsford	7,895	–	–	3	–	2	3	9	–	–	–	3	–
94	Concord	7,852	–	–	32	–	–	–	14	–	–	–	5	–
95	Franklin	7,739	–	–	6	–	–	–	27	–	–	–	11	–
96	Hingham	7,683	1	–	9	–	–	–	7	–	–	–	11	–
97	Whitman	7,605	–	–	1	–	–	–	1	–	1	–	9	–
98	Walpole	7,542	–	–	5	–	–	–	11	–	1	–	5	–
99	Falmouth	7,440	–	–	9	–	–	–	43	–	12	–	19	1
100	North Andover	7,272	–	–	9	–	–	–	28	–	–	–	7	–
101	Shrewsbury	7,266	–	–	6	–	–	–	–	–	–	–	1	–
102	Maynard	7,085	1	–	12	–	–	–	2	–	–	–	6	–
103	Tewksbury	7,076	–	–	–	–	1	–	12	–	–	–	7	–
104	Agawam	7,062	1	–	1	–	–	–	–	–	–	–	6	–
105	Billerica	7,055	–	–	–	–	–	–	6	–	–	–	6	–
106	South Hadley	6,870	–	–	2	–	–	–	8	–	–	–	1	–
107	Canton	6,868	–	–	39	–	–	–	27	–	1	–	3	–
108	Millbury	6,839	2	–	18	–	–	–	6	–	–	–	3	–
109	Winchendon	6,816	–	–	50	–	–	–	2	–	5	–	1	–
110	Amherst	6,782	–	–	17	–	–	–	19	–	–	–	9	–
111	Auburn	6,739	2	–	109	–	–	–	7	–	1	–	1	–
112	Mansfield	6,636	–	–	11	–	–	–	14	–	–	–	3	–
113	Spencer	6,601	–	–	6	–	–	–	10	–	–	–	6	–
114	Great Barrington	6,597	–	–	91	–	–	–	9	–	–	–	7	–
115	Ipswich	6,541	7	–	8	–	–	–	3	–	–	–	5	–
116	Uxbridge	6,457	–	–	12	–	–	–	15	–	1	–	6	–
117	Dracut	6,288	–	–	–	–	–	–	–	–	–	–	3	–
118	Wareham	6,236	–	–	1	–	–	–	4	–	–	–	29	–
119	Foxborough	6,089	1	–	2	–	–	–	1	–	1	–	5	–
120	Westborough	5,898	–	–	16	–	1	–	20	–	2	–	–	–
121	Somerset	5,791	–	–	2	–	1	–	–	–	–	–	3	–
122	Abington	5,606	1	–	–	–	–	–	–	–	–	–	1	–
123	Longmeadow	5,455	–	–	12	–	–	–	7	–	3	–	1	–
124	Orange	5,392	–	–	3	–	–	–	2	–	1	–	1	–
125	Monson	5,337	–	–	30	–	–	–	–	–	–	–	1	–
126	Easton	5,292	–	–	10	–	–	–	14	–	2	–	7	–
127	Seekonk	5,142	–	–	1	–	–	–	3	–	–	–	3	–
	Towns of 2,500-5,000	*215,412*	*21*	*1*	*617*	–	*4*	–	*225*	–	*36*	–	*138*	*1*
128	Wilmington	4,744	–	–	3	–	–	–	8	–	3	–	–	–
129	Dudley	4,727	–	–	1	–	–	–	2	–	–	–	1	–
130	Blackstone	4,544	–	–	–	–	–	–	–	–	–	–	1	–
131	Swansea	4,531	–	–	–	–	–	–	–	–	–	–	4	–
132	Williamstown	4,467	4	–	1	–	–	–	–	–	–	–	1	–
133	Wrentham	4,463	–	–	55	–	–	–	9	–	2	–	4	–
134	Leicester	4,417	–	–	–	–	–	–	–	–	–	–	–	–
135	Oxford	4,410	1	–	1	–	–	–	2	–	1	–	7	–
136	Templeton	4,377	2	–	–	–	–	–	8	–	–	–	4	–
137	Westport	4,328	1	–	9	–	–	–	2	–	–	–	3	–
138	Dalton	4,312	–	–	–	–	–	–	–	–	–	–	2	–

Dangerous to the Public Health, 1937—Continued

Lobar Pneumonia		Measles		Menin. Meningitis		Mumps		Ophthalmia Neonatorum		Scarlet Fever		Syphilis		Tuberculosis, Pulmonary		Tuberculosis, Other Forms		Typhoid Fever		Whooping Cough		
Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Line No.
17	8	16	-	-	-	19	-	1	-	5	-	17	-	8	1	-	-	1	-	168	1	66
22	4	88	-	1	-	7	-	-	-	10	-	5	-	2	2	-	-	-	-	2	-	67
23	10	103	-	4	2	73	-	4	-	34	-	7	-	31	5	3	1	-	-	85	-	68
8	8	305	-	-	-	5	-	-	-	29	-	11	1	5	-	-	-	-	-	38	-	69
1	2	67	1	-	-	5	-	-	-	30	-	7	1	10	3	-	-	-	-	-	-	70
8	7	72	-	-	-	2	-	3	-	18	-	6	-	6	5	1	-	-	-	21	-	71
3	5	4	1	-	-	-	-	-	-	8	-	1	-	8	1	-	-	-	-	-	-	72
2	1	328	-	-	-	10	-	-	-	12	-	5	-	4	1	-	1	-	-	15	-	73
6	4	83	1	-	-	44	-	-	-	33	-	9	-	7	2	-	-	1	-	10	-	74
1	-	3	-	-	-	23	-	-	-	32	-	11	-	3	2	2	-	-	-	16	-	75
5	1	324	1	-	-	44	-	4	-	11	-	6	1	6	1	1	-	-	-	143	-	76
-	4	-	1	-	-	3	-	-	-	-	-	7	-	5	4	-	-	-	-	1	-	77
18	5	4	-	-	-	-	-	-	-	33	-	7	-	4	2	-	-	-	-	9	-	78
222	*142*	*2079*	*1*	*15*	*3*	*305*	-	*12*	-	*571*	*3*	*248*	*11*	*164*	*106*	*15*	*12*	*23*	*3*	*875*	*13*	
4	3	5	-	-	-	3	-	-	-	41	-	7	-	4	6	-	1	-	-	114	2	79
5	-	39	-	-	-	-	-	4	-	9	-	6	-	1	3	3	2	-	-	3	-	80
2	4	37	1	2	-	2	-	-	-	7	-	7	1	3	-	-	-	-	-	33	-	81
7	2	9	-	1	-	19	-	-	-	48	-	8	-	15	6	-	-	-	-	14	-	82
1	6	13	-	-	-	22	-	-	-	28	-	2	-	3	2	-	-	-	-	27	1	83
7	2	2	-	-	-	6	-	-	-	8	-	5	-	7	2	1	-	14	2	22	-	84
4	7	-	-	-	-	-	-	-	-	6	-	5	-	1	4	-	-	-	-	-	-	85
7	4	139	-	1	-	10	-	-	-	14	-	9	1	10	2	-	-	-	-	14	-	86
3	3	124	-	-	-	-	-	-	-	6	-	8	-	3	4	-	1	-	-	4	-	87
2	1	-	-	-	-	-	-	-	-	2	1	11	-	3	2	2	2	2	-	1	-	88
-	-	-	-	1	-	-	-	-	-	2	-	4	-	2	1	-	-	-	-	1	-	89
2	9	-	-	-	-	-	-	-	-	-	-	1	-	1	7	-	-	1	-	-	1	90
4	8	25	-	1	-	2	-	-	-	7	-	3	-	3	3	-	-	-	-	-	-	91
1	1	6	-	-	-	11	-	-	-	-	-	2	-	2	5	1	1	-	-	44	-	92
6	6	3	-	-	-	5	-	-	-	18	-	2	-	7	3	-	-	-	-	33	-	93
1	1	30	-	-	-	1	-	-	-	19	-	7	-	3	1	-	-	-	-	11	-	94
3	3	185	-	-	-	1	-	2	-	16	1	8	-	2	1	-	1	1	-	68	1	95
4	2	4	-	-	1	27	-	-	-	13	-	7	-	-	2	1	1	1	-	4	1	96
4	3	-	-	1	-	6	-	1	-	4	1	6	1	7	2	-	-	-	-	19	-	97
4	1	6	-	1	1	6	-	2	-	18	-	3	-	2	2	-	-	-	-	22	-	98
20	6	217	-	1	-	3	-	1	-	1	-	10	-	7	3	-	1	-	-	12	-	99
6	2	113	-	-	-	-	-	-	-	46	-	4	-	3	-	-	-	-	-	9	-	100
2	1	225	-	-	-	2	-	-	-	8	-	5	-	1	-	-	-	1	-	21	-	101
3	3	-	-	-	-	-	-	-	-	4	-	8	-	2	1	2	-	-	-	1	-	102
-	3	-	-	-	-	-	-	-	-	5	-	9	-	-	1	-	-	-	-	-	1	103
8	2	-	-	-	1	-	-	-	-	22	-	8	2	2	1	2	-	-	-	-	-	104
5	2	-	-	-	-	-	-	-	-	5	-	7	-	-	4	-	-	-	-	-	-	105
11	3	-	-	-	-	-	-	-	-	5	-	2	-	3	1	-	-	-	-	-	1	106
4	4	6	-	1	-	3	-	-	-	9	-	8	-	4	1	-	-	-	-	40	-	107
7	3	200	-	-	-	5	-	-	-	3	-	1	-	3	1	1	-	1	-	29	-	108
9	3	177	-	1	-	1	-	-	-	35	-	4	-	-	-	-	-	-	-	11	-	109
4	-	1	-	-	-	64	-	-	-	6	-	4	-	2	1	-	-	-	-	18	-	110
3	3	192	-	-	-	6	-	-	-	11	-	2	-	3	-	-	-	-	-	58	-	111
1	-	22	-	-	-	2	-	1	-	1	-	3	1	2	1	-	-	-	-	32	1	112
6	2	107	-	-	-	5	-	-	-	7	-	1	-	-	-	-	-	-	-	3	-	113
3	-	2	-	-	-	1	-	-	-	43	-	3	-	1	-	-	-	-	-	63	-	114
4	3	47	-	-	-	1	-	1	-	12	-	5	-	7	3	-	-	1	-	9	-	115
2	3	87	-	-	-	6	-	-	-	4	-	3	-	3	-	-	-	-	-	6	-	116
-	4	1	-	-	-	-	-	-	-	2	-	5	-	1	2	-	-	-	-	-	-	117
6	4	17	-	-	-	-	-	-	-	3	-	24	2	5	4	-	-	-	-	14	2	118
9	7	20	-	1	-	1	-	-	-	10	-	7	-	7	8	-	1	-	-	3	-	119
13	7	1	-	-	-	31	-	-	-	15	-	2	1	4	1	-	-	-	-	9	-	120
-	1	10	-	-	-	-	-	-	-	10	-	2	-	-	4	1	1	-	-	-	1	121
1	1	-	-	-	-	-	-	-	-	1	-	5	-	2	-	-	-	-	-	-	-	122
5	-	-	-	1	-	5	-	-	-	2	-	1	-	5	1	-	-	1	1	38	-	123
3	2	3	-	1	-	44	-	-	-	3	-	1	-	6	1	-	-	-	-	5	-	124
9	4	1	-	1	-	-	-	-	-	17	-	-	1	8	7	-	-	-	-	58	1	125
5	1	3	-	-	-	4	-	-	-	10	-	-	1	1	1	1	-	-	-	2	-	126
2	2	-	-	-	-	-	-	-	-	5	-	3	-	3	1	-	-	-	-	-	-	127
138	*87*	*637*	*1*	*6*	*3*	*349*	-	*4*	-	*265*	*1*	*150*	*13*	*107*	*97*	*9*	*6*	*7*	-	*380*	*2*	
4	3	26	-	-	-	-	-	-	-	3	-	10	-	5	3	-	-	1	-	1	-	128
-	-	-	-	1	1	-	-	-	-	5	-	1	-	3	1	-	-	-	-	-	-	129
-	2	-	-	-	-	-	-	-	-	1	-	1	1	2	2	-	-	-	-	-	-	130
-	1	-	-	-	-	-	-	-	-	2	-	2	-	1	5	1	1	-	-	-	-	131
2	4	31	-	-	-	-	-	-	-	3	-	6	-	1	-	-	-	1	-	3	-	132
19	-	42	-	1	-	2	-	-	-	44	-	1	-	11	8	1	-	-	-	64	-	133
-	-	-	-	-	-	-	-	-	-	1	-	5	-	-	-	-	-	-	-	-	-	134
3	1	8	-	-	-	2	-	1	-	-	-	3	-	1	-	-	-	-	-	16	-	135
-	3	-	-	-	-	-	-	-	-	-	-	9	-	-	3	-	-	-	-	-	-	136
6	1	45	-	1	1	1	-	-	-	4	-	-	-	1	1	-	-	-	-	4	-	137
-	1	-	-	-	-	-	-	-	-	36	-	3	-	2	-	-	-	-	-	-	-	138

Line No.	Cities and Towns in Order of Population	Population estimated as of July 1, 1937	Anterior Poliomyelitis		Chicken Pox		Diphtheria		Dog Bite		German Measles		Gonorrhea	
			Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
139	Ayer	4,284	–	–	31	–	–	–	2	–	–	–	3	–
140	Belchertown	4,243	1	–	7	–	–	–	–	–	–	–	–	–
141	Lee	4,238	–	–	7	–	–	–	6	–	–	–	13	–
142	Scituate	4,230	–	–	–	–	–	–	1	–	–	–	2	–
143	Medfield	4,212	–	–	–	–	1	–	6	–	1	–	3	–
144	Provincetown	4,209	1	–	2	–	–	–	1	–	–	–	3	–
145	Weston	4,118	–	–	52	–	–	–	16	–	–	–	3	–
146	Holden	3,934	1	–	3	–	–	–	12	–	2	–	–	–
147	Westford	3,889	–	–	5	–	–	–	3	–	–	–	2	–
148	Acushnet	3,876	1	–	–	–	1	–	–	–	–	–	6	–
149	Sharon	3,857	–	–	5	–	–	–	15	–	1	–	2	–
150	East Bridgewater	3,711	–	–	88	–	–	–	8	–	7	–	4	–
151	Rockport	3,636	2	–	1	–	–	–	18	–	–	–	1	–
152	Warren	3,607	–	–	30	–	–	–	–	–	7	–	1	–
153	Cohasset	3,594	–	–	–	–	–	–	1	–	–	–	9	–
154	Bourne	3,566	–	–	3	–	–	–	–	–	1	–	5	–
155	Wayland	3,561	–	–	–	–	–	–	–	–	–	–	1	–
156	Barre	3,509	–	–	1	–	–	–	–	–	–	–	3	–
157	Bedford	3,490	–	–	–	–	–	–	1	–	1	–	–	–
158	West Bridgewater	3,434	–	–	16	–	–	–	5	–	–	–	2	–
159	Nantucket	3,404	–	–	–	–	–	–	10	–	–	–	–	–
160	East Longmeadow	3,399	–	–	1	–	–	–	1	–	–	–	4	–
161	Holbrook	3,369	–	–	9	–	1	–	17	–	–	–	4	–
162	Medway	3,328	–	–	5	–	–	–	6	–	1	–	–	–
163	North Brookfield	3,276	–	–	23	–	–	–	–	–	–	–	2	–
164	Hopedale	3,118	–	–	13	–	–	–	1	–	1	–	2	–
165	Dighton	3,101	–	–	5	–	–	–	–	–	–	–	6	–
166	Wilbraham	3,100	–	–	41	–	–	–	3	–	1	–	7	–
167	Pepperell	3,045	–	–	2	–	–	–	3	–	–	–	1	–
168	Norton	3,024	2	–	–	–	–	–	–	–	–	–	1	–
169	Deerfield	3,004	4	–	–	–	–	–	–	–	–	–	1	–
170	Bellingham	2,987	–	–	2	–	–	–	3	–	–	–	–	–
171	Holliston	2,957	–	–	12	–	–	–	2	–	–	–	–	–
172	Hull	2,919	–	–	1	–	–	–	4	–	–	–	–	1
173	Rehoboth	2,863	–	–	–	–	–	–	–	–	–	–	1	–
174	Kingston	2,778	–	–	–	–	–	–	–	–	–	–	3	–
175	Westwood	2,767	–	–	2	–	1	–	1	–	–	–	2	–
176	Hadley	2,726	–	–	–	–	–	–	–	–	–	–	2	–
177	Acton	2,715	–	–	2	–	–	–	8	–	–	–	–	–
178	Lenox	2,691	1	–	1	–	–	–	2	–	–	–	1	–
179	Hanover	2,660	–	–	95	–	–	–	8	–	1	–	–	–
180	Hopkinton	2,642	–	–	11	–	–	–	11	–	–	–	1	–
181	Northboro	2,632	–	–	2	–	–	–	–	–	–	–	4	–
182	Shirley	2,610	–	–	9	–	–	–	6	–	1	–	–	–
183	Groton	2,584	–	–	9	–	–	–	4	–	–	–	1	–
184	Ashland	2,547	–	–	–	–	–	–	–	–	1	–	–	–
185	Sutton	2,546	–	–	4	–	–	–	6	–	–	–	1	–
186	Hanson	2,539	–	–	–	–	–	–	–	–	–	–	–	–
187	Duxbury	2,531	–	–	4	–	–	–	–	–	2	–	1	–
188	North Reading	2,519	–	–	3	–	–	–	1	–	2	–	2	–
189	Douglas	2,513	–	–	40	–	–	–	2	–	–	–	1	–
	Towns of 1,000-2,500	*155,266*	*29*	–	*352*	–	*3*	*1*	*134*	–	*51*	–	*133*	–
190	Charlton	2,476	–	–	–	–	–	–	–	–	–	–	1	–
191	Manchester	2,448	3	–	–	–	–	–	1	–	–	–	3	–
192	Lancaster	2,430	–	–	7	–	2	–	9	–	1	–	2	–
193	Hatfield	2,414	–	–	1	–	–	–	–	–	–	–	–	–
194	Norfolk	2,412	–	–	–	–	–	–	3	–	–	–	3	–
195	Harwich	2,397	–	–	–	–	–	–	–	–	–	–	7	–
196	Rutland	2,389	–	–	–	–	–	–	1	–	–	–	2	–
197	Burlington	2,367	–	–	–	–	–	–	–	–	–	–	2	–
198	Hardwick	2,337	–	–	–	–	–	–	1	–	–	–	–	–
199	Hamilton	2,336	4	–	–	–	–	–	2	–	–	–	2	–
200	Avon	2,335	–	–	8	–	–	–	5	–	–	–	1	–
201	Marshfield	2,307	–	–	4	–	–	–	4	–	–	–	5	–
202	Millis	2,287	–	–	1	–	–	–	2	–	1	–	2	–
203	Salisbury	2,271	2	–	12	–	–	–	5	–	1	–	2	–
204	Yarmouth	2,255	–	–	4	–	–	–	8	–	1	–	1	–
205	Raynham	2,243	–	–	–	–	–	–	–	–	–	–	1	–
206	Upton	2,234	–	–	–	–	–	–	1	–	–	–	–	–
207	Lunenburg	2,219	1	–	19	–	–	–	2	–	5	–	–	–
208	West Boylston	2,183	–	–	48	–	–	–	–	–	–	–	–	–
209	Groveland	2,159	–	–	–	–	–	–	–	–	–	–	–	–
210	Dennis	2,116	–	–	1	–	–	–	6	–	–	–	3	–
211	Merrimac	2,114	2	1	9	–	–	–	11	–	–	–	4	–
212	Chatham	2,113	–	–	–	–	–	–	–	–	–	–	4	–
213	Middleton	2,112	–	–	–	–	–	–	–	–	–	–	1	–

Dangerous to the Public Health, 1937—Continued

Lobar Pneumonia		Measles		Menin. Meningitis		Mumps		Ophthalmia Neonatorum		Scarlet Fever		Syphilis		Tuberculosis, Pulmonary		Tuberculosis, Other Forms		Typhoid Fever		Whooping Cough		
Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Line No.
1	4	4	–	–	–	100	–	–	–	11	–	3	–	–	1	1	–	–	–	2	–	139
3	1	42	–	–	–	3	–	–	–	–	–	1	1	2	2	–	–	–	–	25	–	140
1	1	2	–	–	–	–	–	–	–	19	–	3	1	2	–	–	–	–	–	1	–	141
2	3	2	–	–	–	1	–	–	–	3	–	3	1	–	–	–	–	–	–	–	–	142
9	–	12	–	–	–	3	–	–	–	3	–	7	–	8	13	–	–	–	–	2	–	143
1	–	–	–	–	–	1	–	–	–	2	–	5	1	2	1	–	–	–	–	–	–	144
8	2	7	–	–	–	5	–	–	–	2	–	5	–	2	1	–	–	–	–	3	–	145
1	3	10	–	–	–	22	–	–	–	15	–	1	1	5	2	–	–	–	–	48	–	146
3	2	–	–	–	–	18	–	–	–	1	–	–	–	–	3	–	–	–	–	3	–	147
–	–	–	1	–	–	–	–	1	–	4	–	4	–	5	3	1	1	–	–	–	1	148
1	2	1	–	–	–	–	–	–	–	10	–	–	–	3	1	–	–	1	–	19	–	149
7	–	4	–	–	–	107	–	–	–	7	–	3	–	3	–	2	–	–	–	25	–	150
–	1	2	–	–	–	–	–	–	–	8	–	–	–	2	2	–	–	1	–	–	–	151
2	–	14	–	–	–	5	–	1	–	3	–	1	–	2	1	–	–	–	–	5	–	152
2	1	1	–	–	–	1	–	–	–	1	–	1	–	–	–	–	1	–	–	1	–	153
8	8	3	–	–	–	3	–	–	–	5	–	5	–	6	6	–	–	–	–	4	–	154
2	2	–	–	–	–	–	–	–	–	1	–	6	1	–	1	–	–	–	–	1	–	155
–	1	4	–	1	–	–	–	–	–	6	–	–	–	1	1	–	–	–	–	3	–	156
–	–	9	–	–	–	1	–	–	–	–	–	1	–	–	–	–	–	–	–	6	–	157
3	1	2	–	–	–	26	–	–	–	7	–	1	–	1	–	–	–	–	–	4	–	158
–	–	–	–	–	–	–	–	–	–	–	–	2	1	3	1	–	–	–	–	–	–	159
2	3	–	–	–	–	–	–	–	–	2	–	1	–	3	1	–	–	1	–	3	–	160
3	–	–	–	–	–	4	–	–	–	7	–	–	–	2	1	–	–	1	–	18	–	161
1	2	14	–	–	–	2	–	–	–	1	–	–	–	1	1	–	–	–	–	3	–	162
–	1	3	–	–	–	3	–	–	–	1	–	2	–	–	–	1	1	1	–	24	–	163
4	2	81	–	–	–	–	–	–	–	2	–	–	–	1	–	2	–	–	–	5	–	164
–	1	3	–	–	–	–	–	–	–	1	–	–	–	3	–	–	–	–	–	3	–	165
–	–	60	–	–	–	–	–	–	–	2	–	5	–	3	1	–	–	–	–	–	–	166
–	–	–	–	1	–	–	–	–	–	–	–	2	–	2	2	–	1	–	–	3	–	167
–	–	22	–	–	–	–	–	–	–	1	–	3	–	1	2	–	–	–	–	2	–	168
2	1	1	–	–	–	1	–	–	–	2	–	1	–	1	–	–	–	–	–	6	–	169
1	2	9	–	–	–	–	–	–	–	1	–	2	1	–	1	–	–	–	–	–	–	170
3	1	11	–	–	–	–	–	–	–	–	–	5	–	–	1	–	–	–	–	13	–	171
2	1	1	–	–	–	–	–	–	–	3	–	2	1	2	1	–	–	–	–	8	–	172
1	4	–	–	–	–	–	–	–	–	2	–	–	1	1	3	–	–	–	–	–	1	173
–	–	–	–	–	–	–	–	–	–	–	–	4	–	–	–	–	–	–	–	–	–	174
3	1	2	–	–	–	6	–	–	–	–	–	5	–	1	–	–	–	–	–	10	–	175
–	4	–	–	1	–	–	–	–	–	–	–	–	–	1	1	–	–	–	–	–	–	176
5	–	–	–	–	–	3	–	–	–	4	–	–	–	–	–	–	1	–	–	10	–	177
1	–	–	–	–	–	–	–	–	–	11	1	–	–	2	1	–	–	–	–	–	–	178
5	1	1	–	–	–	18	–	1	–	1	–	3	–	2	–	–	–	–	–	–	–	179
3	1	1	–	–	–	–	–	–	–	–	–	2	–	2	–	–	–	–	–	24	–	180
1	2	2	–	–	–	–	–	–	–	4	–	3	–	–	–	–	–	–	–	2	–	181
2	1	–	–	–	–	–	–	–	–	1	–	1	–	–	–	–	–	–	–	–	–	182
–	1	53	–	–	–	2	–	–	–	2	–	–	1	–	–	–	–	–	–	3	–	183
3	–	3	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	184
4	4	73	–	–	–	1	–	–	–	15	–	–	–	1	1	–	–	–	–	–	–	185
1	2	1	–	–	–	1	–	–	–	2	–	2	1	3	15	–	–	–	–	–	–	186
–	2	22	–	–	–	5	–	–	–	3	–	4	–	–	–	–	–	–	–	–	–	187
1	–	1	–	–	1	1	–	–	–	–	–	8	–	1	3	–	–	–	–	1	–	188
2	2	2	–	–	–	1	–	–	–	4	–	1	–	–	–	–	–	–	–	2	–	189
123	*46*	*946*	–	*3*	*1*	*298*	–	*13*	–	*312*	*3*	*127*	*15*	*78*	*102*	*11*	*8*	*3*	–	*409*	*9*	
–	–	–	–	–	–	–	–	–	–	2	–	–	1	–	–	1	–	–	–	–	–	190
7	2	–	–	–	–	–	–	–	–	–	–	2	–	1	–	–	–	–	–	–	–	191
7	3	117	–	–	–	3	–	–	–	–	–	2	–	4	1	–	–	–	–	5	–	192
–	–	2	–	–	–	–	–	–	–	3	–	2	–	4	1	1	–	–	–	11	–	193
2	–	17	–	–	–	2	–	–	–	1	–	4	1	13	1	–	–	–	–	6	–	194
–	–	–	–	–	–	–	–	–	–	–	–	1	–	3	3	–	–	–	–	1	2	195
2	–	1	–	–	–	4	–	–	–	1	–	1	1	11	39	–	–	–	–	29	–	196
2	2	3	–	–	–	–	–	–	–	4	–	2	–	2	–	–	–	–	–	3	–	197
3	1	6	–	–	–	16	–	–	–	1	–	–	–	1	–	–	–	–	–	1	–	198
7	1	30	–	–	–	–	–	–	–	1	–	–	–	–	1	–	–	–	–	1	–	199
1	–	–	–	–	–	5	–	–	–	26	–	2	–	–	–	–	–	–	–	16	–	200
–	2	5	–	–	–	56	–	–	–	–	–	5	–	–	1	–	–	–	–	–	–	201
–	1	2	–	–	–	–	–	–	–	4	–	2	–	–	–	–	–	–	–	3	–	202
3	1	4	–	–	–	–	–	–	–	12	–	3	–	2	2	–	–	–	–	8	1	203
–	–	33	–	–	–	–	–	–	–	4	–	3	2	1	–	–	–	–	–	1	–	204
–	2	1	–	–	–	–	–	–	–	–	–	–	–	–	1	1	1	–	–	–	–	205
2	–	33	–	–	–	3	–	–	–	5	–	4	–	–	–	–	–	–	–	1	–	206
1	1	49	–	–	–	–	–	–	–	1	–	1	–	2	1	1	–	–	–	–	–	207
1	–	88	–	–	–	16	–	–	–	1	–	2	–	–	–	–	–	1	–	41	–	208
–	–	–	–	–	–	–	–	–	–	2	–	–	1	–	–	–	–	–	–	1	–	209
1	2	6	–	–	–	–	–	–	–	5	–	3	–	1	1	–	–	–	–	–	–	210
3	1	4	–	–	–	1	–	–	–	8	1	3	–	1	–	–	–	–	–	1	–	211
–	–	13	–	–	–	–	–	–	–	–	–	2	–	–	–	–	–	–	–	2	–	212
1	–	9	–	–	–	–	–	–	–	–	–	–	–	–	24	–	–	–	–	–	–	213

Line No.	Cities and Towns in Order of Population	Population estimated as of July 1, 1937	Anterior Poliomyelitis		Chicken Pox		Diphtheria		Dog Bite		German Measles		Gonorrhea	
			Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
214	Georgetown	2,089	–	–	1	–	–	–	14	–	1	–	5	–
215	Southborough	2,079	–	–	40	–	–	–	2	–	1	–	–	–
216	Lynnfield	2,055	–	–	3	–	–	–	4	–	–	–	1	–
217	Townsend	2,041	1	–	–	–	–	–	1	–	–	–	2	–
218	Ashburnham	2,036	–	–	7	–	–	–	1	–	–	–	1	–
219	Stockbridge	2,005	1	–	–	–	–	–	7	–	–	–	1	–
220	Sturbridge	1,996	1	–	–	–	–	–	–	–	–	–	5	–
221	Marion	1,987	–	–	62	–	–	–	3	–	1	–	5	–
222	Westminster	1,985	–	–	–	–	–	–	–	–	–	–	1	–
223	Northfield	1,983	1	–	2	–	–	–	–	–	2	–	1	–
224	Tisbury	1,968	–	–	–	–	–	–	–	–	–	–	2	–
225	Freetown	1,897	–	–	–	–	–	–	–	–	–	–	–	–
226	Sheffield	1,894	–	–	27	–	1	1	–	–	–	–	–	–
227	Sudbury	1,878	–	–	–	–	–	–	–	–	–	–	2	–
228	Williamsburg	1,844	–	–	17	–	–	–	2	–	–	–	1	–
229	Oak Bluffs	1,827	–	–	–	–	–	–	–	–	–	–	5	–
230	Nahant	1,795	–	–	–	–	–	–	6	–	–	–	–	–
231	Millville	1,792	–	–	–	–	–	–	–	–	–	–	–	–
232	Mattapoisett	1,777	–	–	12	–	–	–	–	–	1	–	6	–
233	Norwell	1,744	–	–	–	–	–	–	–	–	–	–	1	–
234	Pembroke	1,690	–	–	–	–	–	–	–	–	–	–	4	–
235	Carver	1,652	–	–	–	–	–	–	–	–	–	–	–	–
236	Cheshire	1,643	–	–	–	–	–	–	1	–	–	–	1	–
237	Colrain	1,640	–	–	–	–	–	–	–	–	–	–	2	–
238	Shelburne	1,639	1	–	2	–	–	–	–	–	–	–	–	–
239	Plainville	1,617	–	–	–	–	–	–	–	–	–	–	–	–
240	Lincoln	1,614	–	–	–	–	–	–	2	–	–	–	1	–
241	Newbury	1,600	–	–	–	–	–	–	2	–	–	–	–	–
242	Sterling	1,582	1	–	–	–	–	–	1	–	–	–	–	–
243	Southwick	1,581	–	–	3	–	–	–	1	–	–	–	1	–
244	Littleton	1,571	–	–	2	–	–	–	–	–	–	–	1	–
245	Rowley	1,566	4	–	–	–	–	–	4	–	1	–	–	–
246	Buckland	1,564	2	–	–	–	–	–	–	–	–	–	2	–
247	Sandwich	1,557	–	–	–	–	–	–	–	–	–	–	3	–
248	Orleans	1,551	–	–	–	–	–	–	9	–	–	–	5	–
249	Boylston	1,499	–	–	–	–	–	–	–	–	–	–	1	–
250	Essex	1,497	–	–	–	–	–	–	–	–	–	–	1	–
251	Edgartown	1,464	–	–	–	–	–	–	–	–	–	–	4	–
252	West Newbury	1,435	1	–	1	–	–	–	–	–	–	–	–	–
253	Huntington	1,399	–	–	–	–	–	–	–	–	–	–	1	–
254	Lakeville	1,374	–	–	2	–	–	–	–	–	–	–	4	–
255	Dover	1,361	–	–	2	–	–	–	–	–	1	–	1	–
256	Clarksburg	1,351	–	–	–	–	–	–	–	–	–	–	1	–
257	Mendon	1,348	1	–	–	–	–	–	–	–	–	–	–	–
258	Tyngsborough	1,316	–	–	–	–	–	–	1	–	1	–	2	–
259	Chester	1,307	–	–	–	–	–	–	–	–	–	–	2	–
260	Russell	1,307	–	–	–	–	–	–	–	–	–	–	–	–
261	Erving	1,288	–	–	3	–	–	–	–	–	2	–	–	–
262	Brookfield	1,285	–	–	–	–	–	–	4	–	2	–	3	–
263	Rochester	1,274	–	–	–	–	–	–	1	–	–	–	2	–
264	Lanesborough	1,272	–	–	–	–	–	–	–	–	–	–	–	–
265	West Brookfield	1,260	–	–	8	–	–	–	–	–	–	–	2	–
266	Wenham	1,236	1	–	–	–	–	–	1	–	–	–	1	–
267	Stow	1,214	–	–	14	–	–	–	–	–	28	–	–	–
268	Sunderland	1,193	–	–	–	–	–	–	–	–	–	–	–	–
269	Topsfield	1,178	1	–	26	–	–	–	3	–	–	–	–	–
270	Berkley	1,174	–	–	–	–	–	–	–	–	–	–	–	–
271	Hinsdale	1,144	1	–	–	–	–	–	–	–	–	–	–	–
272	West Stockbridge	1,142	–	–	2	–	–	–	–	–	–	–	3	–
273	Whately	1,132	–	–	–	–	–	–	–	–	–	–	–	–
274	Berlin	1,100	–	–	–	–	–	–	–	–	–	–	–	–
275	Sherborn	1,020	–	–	1	–	–	–	–	–	–	–	–	–
276	Bernardston	1,016	–	–	–	–	–	–	–	–	–	–	–	–
277	Wellfleet	1,013	–	–	–	–	–	–	–	–	–	–	–	–
278	Gill	1,000	–	–	1	–	–	–	–	–	1	–	–	–
	Towns under 1,000	*40,205*	*6*	–	*121*	–	*1*	–	*41*	–	*6*	–	*24*	–
279	Hubbardston	996	–	–	–	–	–	–	–	–	–	–	–	–
280	Granby	989	–	–	–	–	–	–	–	–	–	–	–	–
281	Charlemont	979	–	–	–	–	–	–	–	–	–	–	–	–
282	Conway	978	–	–	–	–	–	–	–	–	–	–	–	–
283	Southampton	965	–	–	1	–	–	–	–	–	–	–	–	–
284	East Brookfield	954	–	–	–	–	–	–	2	–	–	–	–	–
285	New Marlboro	951	1	–	13	–	–	–	3	–	2	–	2	–
286	Ashfield	948	–	–	–	–	–	–	–	–	–	–	–	–
287	Ashby	945	–	–	12	–	1	–	–	–	–	–	–	–
288	Hampden	944	–	–	1	–	–	–	–	–	–	–	–	–

Dangerous to the Public Health, 1937—Continued

Lobar Pneumonia		Measles		Menin. Meningitis		Mumps		Ophthalmia Neonatorum		Scarlet Fever		Syphilis		Tuberculosis, Pulmonary		Tuberculosis, Other Forms		Typhoid Fever		Whooping Cough		
Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Line No.
4	1	2	-	-	-	19	-	-	-	1	-	3	-	-	1	-	1	-	-	-	-	214
1	-	66	-	-	-	2	-	12	-	-	-	7	-	1	-	-	-	-	-	1	-	215
3	2	19	-	-	-	15	-	-	-	1	-	1	1	1	-	-	-	-	-	-	-	216
1	-	4	-	1	1	-	-	-	-	-	-	1	1	3	1	-	-	-	-	81	-	217
2	2	24	-	-	-	-	-	-	-	2	-	-	-	3	-	-	-	-	-	-	-	218
1	1	-	-	-	-	1	-	-	-	23	-	1	-	-	-	1	-	-	-	22	1	219
-	-	1	-	-	-	-	-	-	-	4	-	-	-	2	-	1	-	-	-	1	-	220
6	1	101	-	-	-	3	-	1	-	-	-	2	1	-	-	-	-	-	-	25	-	221
-	1	-	-	-	-	-	-	-	-	4	-	1	-	-	1	-	-	-	-	-	-	222
2	2	7	-	-	-	7	-	-	-	-	-	2	-	-	1	-	-	-	-	-	-	223
-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	224
-	1	-	-	-	-	-	-	-	-	-	-	3	-	-	1	-	-	-	-	-	-	225
-	-	1	-	-	-	17	-	-	-	11	-	1	-	-	-	-	-	-	-	6	-	226
-	-	-	-	-	-	-	-	-	-	1	-	2	-	-	-	-	-	-	-	-	-	227
8	-	3	-	-	-	-	-	-	-	66	-	-	-	-	-	-	-	-	-	26	-	228
-	1	-	-	-	-	-	-	-	-	1	-	3	-	-	-	-	-	1	-	-	2	229
2	-	63	-	-	-	-	-	-	-	2	-	2	-	1	1	-	-	-	-	6	-	230
-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	231
4	-	8	-	-	-	1	-	-	-	-	-	1	1	3	-	-	-	-	-	1	-	232
1	-	1	-	-	-	-	-	-	-	12	-	3	-	-	-	-	-	-	-	2	-	233
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	234
-	-	3	-	-	-	-	-	-	-	1	-	4	2	-	2	-	-	-	-	-	-	235
-	-	-	-	-	-	-	-	-	-	1	-	2	-	1	-	-	-	-	-	-	-	236
7	1	7	-	-	-	3	-	-	-	9	-	1	-	-	1	-	-	-	-	-	-	237
10	4	5	-	-	-	-	-	-	-	5	-	-	-	-	1	-	-	-	-	1	-	238
-	2	-	-	-	-	-	-	-	-	-	-	2	-	-	-	1	1	-	-	-	-	239
2	2	5	-	-	-	2	-	-	-	3	-	2	-	1	-	-	-	-	-	5	-	240
-	-	-	-	-	-	-	-	-	-	-	-	2	-	1	-	-	-	1	-	-	-	241
-	-	8	-	-	-	25	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	242
-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	243
-	1	2	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	244
-	-	12	-	-	-	-	-	-	-	10	-	4	-	-	-	-	1	-	-	-	-	245
-	-	1	-	-	-	-	-	-	-	5	-	-	-	-	-	-	-	-	-	-	-	246
-	-	2	-	-	-	-	-	-	-	1	-	1	-	2	2	-	-	-	-	1	1	247
-	-	2	-	-	-	64	-	-	-	2	-	2	-	1	-	-	-	-	-	-	-	248
1	1	-	-	-	-	-	-	-	-	-	-	1	1	-	3	-	-	-	-	-	-	249
1	-	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	250
-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	1	-	-	-	-	-	-	251
-	1	-	-	-	-	-	-	-	-	1	-	1	-	1	-	-	-	-	-	4	-	252
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	253
-	-	-	-	-	-	-	-	-	-	1	-	-	1	-	2	4	1	-	-	-	-	254
-	-	59	-	-	-	21	-	-	-	3	-	1	-	-	-	-	-	-	-	6	-	255
2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	256
2	1	16	-	-	-	4	-	-	-	1	-	2	-	1	-	-	-	-	-	7	-	257
-	-	-	-	1	-	-	-	-	-	-	-	3	-	1	1	-	-	-	-	14	-	258
-	-	1	-	-	-	-	-	-	-	11	-	1	-	1	1	-	1	-	-	-	-	259
-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	4	-	260
-	-	3	-	-	-	-	-	-	-	17	-	-	-	-	1	-	-	-	-	-	-	261
-	-	-	-	-	-	-	-	-	-	8	-	-	-	-	-	-	-	-	-	4	-	262
-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1	263
-	-	-	-	-	-	-	-	-	-	-	1	4	-	-	-	-	-	-	-	7	-	264
6	-	2	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	10	-	265
1	-	1	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	266
-	-	4	-	-	-	-	-	-	-	2	-	4	-	-	-	-	-	-	-	18	-	267
1	-	-	-	1	-	-	-	-	-	3	-	-	-	2	-	-	-	-	-	-	-	268
6	1	31	-	-	-	-	-	-	-	3	-	-	-	1	-	-	-	-	-	-	-	269
-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	-	-	-	-	1	1	270
-	-	-	-	-	-	-	-	-	-	5	-	2	1	-	-	-	-	-	-	-	-	271
1	-	2	-	-	-	1	-	-	-	2	-	-	-	-	-	-	-	-	-	16	-	272
2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	273
1	-	12	-	-	-	1	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	274
-	-	-	-	-	-	-	-	-	-	2	-	2	-	-	1	-	1	-	-	-	-	275
2	-	1	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	7	-	276
-	-	-	-	-	-	-	-	-	-	-	1	2	-	2	1	-	-	-	-	-	-	277
-	-	33	-	-	-	1	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	278
17	*14*	*199*	-	-	-	*94*	-	-	-	*111*	*1*	*23*	*2*	*13*	*7*	*3*	-	*1*	-	*104*	*1*	
-	-	-	-	-	-	1	-	-	-	1	-	4	-	-	-	-	-	-	-	-	-	279
1	-	-	-	-	-	5	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	280
-	-	4	-	-	-	-	-	-	-	3	-	-	-	-	1	-	-	-	-	-	-	281
2	1	6	-	-	-	-	-	-	-	9	-	1	-	-	-	-	-	1	-	-	-	282
-	1	1	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	283
-	-	1	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	3	-	284
-	-	2	-	-	-	2	-	-	-	-	-	1	-	1	-	-	-	-	-	5	-	285
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	286
1	-	-	-	-	-	-	-	-	-	4	1	-	1	-	-	-	-	-	-	-	-	287
1	1	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	288

Line No.	Cities and Towns in Order of Population	Population estimated as of July 1, 1937	Anterior Poliomyelitis		Chicken Pox		Diphtheria		Dog Bite		German Measles		Gonorrhea	
			Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
289	Harvard	936	–	–	–	–	–	–	5	–	–	–	–	–
290	Brimfield	895	–	–	–	–	–	–	–	–	–	–	1	–
291	Royalston	891	–	–	–	–	–	–	–	–	–	–	1	–
292	Halifax	862	–	–	–	–	–	–	1	–	–	–	–	–
293	Boxford	765	–	–	4	–	–	–	5	–	–	–	–	–
294	Paxton	762	–	–	–	–	–	–	–	–	–	–	2	–
295	Carlisle	752	–	–	–	–	–	–	2	–	–	–	2	–
296	Leverett	750	–	–	–	–	–	–	–	–	–	–	–	–
297	Becket	750	–	–	2	–	–	–	6	–	1	–	–	–
298	Petersham	749	–	–	28	–	–	–	–	–	–	–	–	–
299	Bolton	728	–	–	–	–	–	–	–	–	–	–	–	–
300	Granville	720	–	–	–	–	–	–	–	–	–	–	–	–
301	Princeton	703	–	–	–	–	–	–	–	–	–	–	–	–
302	Brewster	689	–	–	–	–	–	–	3	–	–	–	1	–
303	Warwick	670	–	–	–	–	–	–	–	–	–	–	–	–
304	Richmond	653	–	–	1	–	–	–	–	–	–	–	–	–
305	Cummington	651	–	–	–	–	–	–	–	–	–	–	–	–
306	Eastham	639	4	–	–	–	–	–	–	–	–	–	–	–
307	Egremont	599	–	–	–	–	–	–	1	–	–	–	1	–
308	Plympton	582	–	–	–	–	–	–	–	–	–	–	–	–
309	Truro	556	–	–	–	–	–	–	–	–	–	–	–	–
310	Worthington	554	–	–	–	–	–	–	–	–	–	–	–	–
311	Pelham	528	–	–	–	–	–	–	–	–	–	–	1	–
312	Sandisfield	501	–	–	–	–	–	–	–	–	–	–	1	–
313	Enfield	495	–	–	–	–	–	–	–	–	–	–	–	–
314	New Salem	458	–	–	–	–	–	–	–	–	–	–	–	–
315	Chesterfield	456	–	–	16	–	–	–	–	–	3	–	1	–
316	Phillipston	456	–	–	–	–	–	–	10	–	–	–	1	–
317	Florida	455	–	–	–	–	–	–	–	–	–	–	1	–
318	Boxboro	452	–	–	–	–	–	–	–	–	–	–	–	–
319	New Braintree	451	–	–	–	–	–	–	–	–	–	–	–	–
320	Plainfield	443	1	–	–	–	–	–	–	–	–	–	–	–
321	Otis	439	–	–	–	–	–	–	–	–	–	–	–	–
322	Dunstable	437	–	–	1	–	–	–	–	–	–	–	–	–
323	Hancock	432	–	–	–	–	–	–	–	–	–	–	–	–
324	Blandford	429	–	–	–	–	–	–	–	–	–	–	2	–
325	Windsor	424	–	–	–	–	–	–	–	–	–	–	–	–
326	Wendell	422	–	–	–	–	–	–	–	–	–	–	1	–
327	Westhampton	420	–	–	–	–	–	–	–	–	–	–	–	–
328	Oakham	409	–	–	–	–	–	–	–	–	–	–	–	–
329	Wales	394	–	–	16	–	–	–	–	–	–	–	–	–
330	Mashpee	389	–	–	–	–	–	–	–	–	–	–	4	–
331	Heath	386	–	–	–	–	–	–	–	–	–	–	–	–
332	Monterey	327	–	–	3	–	–	–	–	–	–	–	–	–
333	Dana	325	–	–	–	–	–	–	–	–	–	–	–	–
334	Hawley	307	–	–	–	–	–	–	1	–	–	–	–	–
335	Savoy	294	–	–	–	–	–	–	–	–	–	–	–	–
336	West Tisbury	287	–	–	–	–	–	–	–	–	–	–	–	–
337	Washington	267	–	–	–	–	–	–	2	–	–	–	–	–
338	Rowe	265	–	–	–	–	–	–	–	–	–	–	–	–
339	Goshen	260	–	–	–	–	–	–	–	–	–	–	–	–
340	Chilmark	253	–	–	–	–	–	–	–	–	–	–	–	–
341	Leyden	251	–	–	–	–	–	–	–	–	–	–	–	–
342	Monroe	251	–	–	–	–	–	–	–	–	–	–	–	–
343	Shutesbury	248	–	–	–	–	–	–	–	–	–	–	1	–
344	Tyringham	242	–	–	2	–	–	–	–	–	–	–	–	–
345	Holland	233	–	–	10	–	–	–	–	–	–	–	–	–
346	Middlefield	231	–	–	–	–	–	–	–	–	–	–	–	–
347	Alford	214	–	–	11	–	–	–	–	–	–	–	–	–
348	Greenwich	206	–	–	–	–	–	–	–	–	–	–	–	–
349	Montgomery	191	–	–	–	–	–	–	–	–	–	–	–	–
350	Peru	171	–	–	–	–	–	–	–	–	–	–	–	–
351	Gay Head	158	–	–	–	–	–	–	–	–	–	–	–	–
352	Tolland	143	–	–	–	–	–	–	–	–	–	–	–	–
353	Gosnold	132	–	–	–	–	–	–	–	–	–	–	1	–
354	New Ashford	103	–	–	–	–	–	–	–	–	–	–	–	–
355	Mt. Washington	65	–	–	–	–	–	–	–	–	–	–	–	–
356	Tewksbury State Infirmary		–	–	–	–	15	–	–	–	–	–	–	–

Dangerous to the Public Health, 1937—Concluded

Lobar Pneumonia		Measles		Menin. Meningitis		Mumps		Ophthalmia Neonatorum		Scarlet Fever		Syphilis		Tuberculosis, Pulmonary		Tuberculosis, Other Forms		Typhoid Fever		Whooping Cough		
Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Line No.
–	–	2	–	–	–	–	–	–	–	–	–	1	1	–	–	–	–	–	–	–	–	289
–	1	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	290
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	291
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	292
1	1	17	–	–	–	–	–	–	–	1	–	1	–	–	1	–	–	–	–	–	–	293
–	1	43	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	294
–	–	–	–	–	–	–	–	–	–	4	–	2	–	–	–	–	–	–	–	–	–	295
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	1	296
–	1	1	–	–	–	15	–	–	–	5	–	1	–	2	–	–	–	–	–	8	–	297
–	–	4	–	–	–	3	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	298
–	–	5	–	–	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	–	–	299
2	1	–	–	–	–	–	–	–	–	–	–	3	–	–	–	–	–	–	–	–	–	300
1	–	77	–	–	–	11	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	301
–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	302
–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	303
1	–	1	–	–	–	–	–	–	–	6	–	2	–	–	–	–	–	–	–	–	–	304
–	–	–	–	–	–	–	–	–	–	10	–	1	–	–	–	1	–	–	–	–	–	305
–	–	5	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	306
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3	–	307
–	–	–	–	–	–	–	–	–	–	–	–	3	–	–	–	–	–	–	–	–	–	308
–	–	12	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	309
–	1	–	–	–	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	6	–	310
–	–	–	–	–	–	3	–	–	–	5	–	–	–	–	–	–	–	–	–	6	–	311
–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	312
–	–	–	–	–	–	53	–	–	–	–	–	–	–	–	–	–	–	–	–	8	–	313
–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	1	–	–	–	–	1	–	314
–	–	2	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	20	–	315
–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	–	1	–	–	–	–	–	316
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	317
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	318
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	319
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	320
2	–	–	–	–	–	–	–	–	–	6	–	–	–	–	–	–	–	–	–	–	–	321
–	–	9	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	8	–	322
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	323
1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	–	–	–	–	–	–	324
–	–	–	–	–	–	–	–	–	–	4	–	–	–	1	–	–	–	–	–	–	–	325
–	–	2	–	–	–	–	–	–	–	4	–	–	–	–	–	–	–	–	–	–	–	326
2	2	–	–	–	–	–	–	–	–	4	–	1	–	–	–	–	–	–	–	–	–	327
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	328
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	329
–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	1	–	–	–	–	–	–	330
–	–	–	–	–	–	–	–	–	–	5	–	–	–	–	–	–	–	–	–	–	–	331
–	–	3	–	–	–	–	–	–	–	–	–	–	–	2	–	–	–	–	–	–	–	332
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	333
–	1	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	334
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	335
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	336
–	–	–	–	–	–	–	–	–	–	4	–	–	–	–	–	–	–	–	–	6	–	337
–	2	–	–	–	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	–	–	338
–	–	2	–	–	–	–	–	–	–	5	–	–	–	–	–	–	–	–	–	13	–	339
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	340
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	341
–	–	–	–	–	–	–	–	–	–	4	–	–	–	–	–	–	–	–	–	–	–	342
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	343
–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	344
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	345
2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	346
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	10	–	347
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	348
–	–	–	–	–	–	–	–	–	–	3	–	–	–	–	–	–	–	–	–	–	–	349
–	–	–	–	–	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	5	–	350
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	351
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	352
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	353
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	354
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	355
18	5	–	–	5	1	–	–	–	–	2	–	–	2	55	19	–	1	–	–	–	–	356

In addition to the foregoing, there occurred 1 death from actinomycosis.

	Cases	Deaths
Sunderland	–	1

6 cases of anthrax:

Lynn	4	–
Saugus	1	–
Winchester	1	–

102 cases of dysentery with 6 deaths:

Amebic		
Boston	1	2
Chelsea	1	–
Newton	1	–
Bacillary		
Avon	1	–
Belchertown	5	–
Beverly	3	–
Boston	5	–
Cambridge	14	–
Chicopee	–	1
Danvers	1	–
Fall River	6	–
Lawrence	1	–
Medford	1	–
Milford	2	–
New Bedford	3	–
Newton	1	–
Reading	1	–
Revere	1	–
Somerville	2	–
Stoughton	–	1
Waltham	18	–
Wellesley	27	–
Williamsburg	1	–
Worcester	6	2

19 cases of encephalitis lethargica with 14 deaths:

Clinton	1	–
Danvers	1	–
Dartmouth	1	–
Everett	–	1
Fairhaven	1	–
Haverhill	2	1
Holyoke	1	–
Lawrence	1	1
Lynn	1	1
Medford	1	–
Methuen	–	1
New Bedford	1	1
Northampton	1	3
Revere	1	1
Salem	1	1
Shelburne	–	1
Southwick	1	–
Springfield	1	1
Swampscott	1	–
Warren	1	1
Worcester	1	–

1 case of leprosy:

New Bedford	1	–

15 cases of malaria with 2 deaths:

Avon	1	–
Boston	2	2
Cambridge	1	–
Chelsea	1	–
Fall River	1	–
Foxboro	3	–
Gloucester	1	–
Lancaster	1	–
Medford	1	–
Pembroke	1	–
Quincy	1	–
Springfield	1	–

1 case of paratyphoid A:

Brockton	1	–

267 cases of paratyphoid B with 2 deaths:

Adams	1	–
Amesbury	1	–
Amherst	6	–
Belmont	1	–
Billerica	3	–
Boston	26	–
Bridgewater	1	–
Brookline	9	–
Burlington	1	–
Cambridge	1	–
Chelsea	1	–
Cohasset	1	–
Conway	2	–
Deerfield	7	–
Dracut	1	–
Easthampton	2	–
Easton	1	–
East Longmeadow	1	–
Everett	3	–
Greenfield	12	–
Lawrence	14	–
Leominster	1	–
Lincoln	1	–
Lowell	24	–
Lynn	24	–
Malden	3	–
Manchester	1	–
Marblehead	2	–
Medford	3	–
Melrose	10	–
Methuen	4	–
Milton	1	–
Monterey	1	–
Natick	1	–
Needham	1	–
Newton	1	–
Northampton	5	–
North Attleboro	1	–
Quincy	5	–
Reading	3	–
Revere	2	–
Sandwich	1	–
Saugus	3	–
Shelburne	1	–
Somerville	2	–
South Hadley	1	–
Stoneham	9	1
Sunderland	1	–
Swampscott	1	–
Wakefield	9	–
Waltham	3	–
Wellesley	3	–
Westfield	2	–
West Springfield	1	–
Weymouth	2	–
Williamstown	1	–
Winchendon	1	–
Winchester	24	–
Winthrop	1	1
Woburn	12	–

11 cases of pellagra with 13 deaths:

Boston	4	8
Cambridge	1	1
Cheshire	1	1
Fall River	–	1
Pittsfield	1	1
Revere	1	–
Salem	2	–
Worcester	1	1

3 cases of Pfeiffer Bacillus Meningitis with 3 deaths:

Greenfield	1	1
Longmeadow	1	1
Westfield	1	1

195 cases of septic sore throat with 42 deaths:

Amesbury	1	–
Andover	35	–
Belmont	2	–
Beverly	3	–
Boston	54	9
Braintree	2	–
Brookline	5	2
Burlington	–	1
Cambridge	7	2
Chelmsford	1	–
Chelsea	1	–
Dartmouth	1	1
Dedham	–	2
Dracut	–	1
East Bridgewater	5	–
Easthampton	1	–
Erving	–	1
Everett	2	1
Fall River	4	–
Freetown	–	1
Gardner	17	–
Gloucester	–	1

	Cases	Deaths
Greenfield	4	–
Hampden	1	1
Hardwick	–	1
Holyoke	–	1
Hudson	–	1
Lawrence	3	2
Lowell	1	1
Lynn	4	–
Mansfield	1	–
Marblehead	2	1
Marlboro	1	–
Medfield	–	1
Medford	5	–
Melrose	1	1
Merrimac	1	–
Middleboro	1	–
Milton	1	–
Natick	1	–
Needham	1	1
Newburyport	1	–
Newton	1	2
Northampton	1	–
Pittsfield	1	–
Quincy	2	–
Revere	2	–
Rowley	2	1
Rutland	1	1
Sandwich	–	1
Saugus	2	–
Shrewsbury	–	1
Somerville	2	1
South Hadley	1	1
Southbridge	1	–
Springfield	1	–
Sturbridge	1	–
Topsfield	1	–
Waltham	1	–
Watertown	1	–
Webster	1	–
Wellesley	1	–
Westford	–	1
Winchester	1	–
Worcester	1	–

17 cases of tetanus with 13 deaths:

Amherst	1	1
Attleboro	1	1
Boston	2	2
Cambridge	1	–
Chelsea	1	–
Dedham	1	1
Great Barrington	1	1
Mansfield	–	1
Marlboro	1	1
Medford	1	–
New Bedford	1	1
Newburyport	1	1
Saugus	–	1
Somerville	1	–
Stow	1	–
Taunton	1	1
West Springfield	1	–
Worthington	1	1

22 cases of trachoma:

Boston	3	–
Dudley	1	–
Everett	1	–
Framingham	1	–
Holyoke	1	–
Lynn	1	–
Malden	1	–
Medford	1	–
Pittsfield	1	–
Plymouth	1	–
Quincy	1	–
Somerville	1	–
Springfield	1	–
Watertown	3	–
West Springfield	1	–
Worcester	3	–

21 cases of trichinosis with 1 death:

Boston	9	–
Cambridge	4	–
Fitchburg	1	–
Lawrence	1	1
Maynard	1	–
Medford	1	–
Pepperell	1	–
Quincy	1	–
Springfield	1	–
Weymouth	1	–

609 cases of tuberculosis, hilum:

Belmont	3	–
Boston	393	–
Braintree	1	–
Cambridge	9	–
Chelsea	8	–
Chicopee	18	–
Dartmouth	2	–
Everett	1	–
Fitchburg	20	–
Gardner	2	–
Haverhill	3	–
Holden	3	–
Holyoke	2	–
Lawrence	1	–
Lexington	1	–
Lowell	1	–
Ludlow	1	–
Lynn	5	–
Malden	4	–
Medford	4	–
Melrose	1	–
Natick	1	–
New Bedford	76	–
Peabody	4	–
Pittsfield	2	–
Quincy	11	–
Revere	10	–
Salem	1	–
Somerville	2	–
Southbridge	1	–
Springfield	8	–
Swampscott	5	–
Wakefield	1	–
Waltham	1	–
Westfield	2	–
Worcester	1	–

1 case of typhus fever:

Boston	1	–

43 cases of undulant fever with 2 deaths:

Ashby	2	–
Athol	1	–
Beverly	1	–
Boxboro	1	–
Brookline	1	–
Carver	1	–
Chicopee	1	–
Dighton	1	–
Fitchburg	1	–
Franklin	1	–
Gardner	1	–
Groton	1	–
Haverhill	1	–
Hingham	1	–
Holyoke	1	–
Hopedale	1	–
Hopkinton	1	–
Lancaster	1	–
Lunenburg	1	–
Natick	1	–
Nantucket	2	–
North Adams	3	–
Northampton	1	1
Orange	1	–
Oxford	2	–
Peabody	1	–
Pittsfield	2	–
Shrewsbury	1	–
Sterling	1	–
Stockbridge	–	1
Stow	1	–
Taunton	2	–
Wellesley	1	–
West Brookfield	1	–
Westfield	1	–
Whitman	1	–
Worcester	1	–

REPORT OF THE DIVISION OF FOOD AND DRUGS

HERMANN C. LYTHGOE, *Director*

The Food and Drug Division during the year 1937 has been engaged in the usual routine work relative to the enforcement of the laws pertaining to the sale of milk, foods and drugs; the slaughtering laws; the cold storage laws; the bakery law; the mattress law; the frozen dessert law; the law pertaining to the pasteurization of milk; the law pertaining to the bottling of carbonated nonalcoholic beverages; certain phases of the narcotic law; and the law pertaining to the sale of wood alcohol; as well as in the examination of liquor and chemical samples submitted by the Police Departments.

There was one change in legislation during 1937, establishing a standard for cream cheese. This permits the use of vegetable gums and it establishes a fat and moisture standard.

The additional inspector and laboratory technician appointed under Federal Funds in 1936 are still employed, the work being confined mostly to the examination of milk intended to be pasteurized. Two inspectors were appointed in the early spring, being compensated from Federal Funds. One of these inspectors resigned in the early fall and the other inspector resigned at the close of the fiscal year. These two positions were abolished and the money was reallocated.

Licenses and permits as follows have been issued:

Under the law pertaining to the sterilization of feathers, down, and secondhand material, eight licenses at $50.00.

Under the frozen dessert law, 23 permits to out-of-State manufacturers, the fee depending upon the quantity imported, the total fees amounting to $740.52.

Under the law pertaining to State licenses for dealers in wood alcohol, 146 licenses at $10.00.

Under the narcotic law, 50 licenses at $10.00.

Under the law pertaining to the importation of carbonated nonalcoholic beverages, 33 permits at $20.00.

Under the law pertaining to permits for manufacturing carbonated nonalcoholic beverages, there was $2,180.00 received from the cities and towns of the State, representing half of the fees collected by them.

There were 56 licenses for the operation of cold storage warehouses at $10.00.

The total of the above fees was $6,500.52.

PROSECUTIONS

There were 291 prosecutions, which is somewhat less than the average and considerably below the number of prosecutions last year. This reduction from last year's number is due in part to a reduction in violations of the milk law, the cessation of the use of tea seed oil as an adulterant of olive oil, a reduction in violations of the law pertaining to the bottling of soft drinks, and a reduction in the violations relative to the bedding and upholstery law.

There were six cases pertaining to the sale of low standard milk, three cases pertaining to the sale of milk from which a portion of the cream had been removed, and three cases pertaining to the sale of milk containing added water. One case was dismissed, the defendant being convicted upon another charge, and the balance of the cases resulted in conviction.

There was one conviction for the sale of milk without a milk license. This person, operating a restaurant, was advised by the local inspector on several occasions to take out a milk license and was warned about the use of a spigot tank for the sale of milk by the glass. Subsequent to this warning, an inspector of the Department purchased a glass of milk which was partially skimmed and the defendant was prosecuted for the sale of low standard milk and also for selling milk without a milk license.

There was one conviction for the delivery of milk in a dirty bottle. The department has many complaints of this nature but in nearly all instances the circumstances are such that it is inadvisable to bring criminal action. It is a comparatively easy matter to put some dirt into a partly filled bottle of milk, bring the bottle to the department and say that it has made the family sick. In this instance, however, the bottle had not been opened, the cap had been placed on by machine,

and the dirt was very evident to the casual observer. The unopened bottle was exhibited to the court at the trial.

The Grade A regulations and the regulations of certain boards of health require milk to bear a date upon the cap, in some instances the date of pasteurization, in other instances the date of production. This regulation is frequently violated. If an inspector is in a pasteurization establishment and sees milk being post dated, the excuse is that the man by accident picked up the wrong tube of caps and then the incorrectly dated caps will be removed and the correct dates will be substituted in the presence of the inspector. Of the three cases brought before the courts, one was dismissed, one was found not guilty, and the other case resulted in a conviction. In this last case, involving certified milk, the defendant had been warned to properly date the milk.

There were sixteen cases for improper pasteurization of milk. One person was found not guilty and, by a strange coincidence, this person had been prosecuted several years ago for the same offense in the same court with the same result. Another case was dismissed as the defendant was a partner of a person who was convicted. The evidence in these cases was secured in eight instances by direct evidence, that is, by seeing the milk improperly pasteurized or by the use of the recording thermometer charts which showed improper pasteurization. The other eight cases resulted from the use of the phosphatase test.

There were thirteen cases for violation of the pasteurization law and regulations. Two defendants were found not guilty and one case was dismissed. Most of these cases were because of unsanitary conditions in the plant.

There were ten cases for violation of the milk grade regulations, all resulting in conviction, the violations consisting of either high bacteria counts or of low fat content.

There was one conviction for the sale of butter containing less than 80% of fat.

There were 28 cases for the sale of hamburg steak in violation of the law pertaining to the use of sodium sulphite. Two defendants were found not guilty, three cases were dismissed, one corporation defaulted and a penalty of $50.00 was imposed and a writ was issued by the court. The violation in most instances was failure to label the package as required by law. If, however, the quantity exceeded 0.1%, the complaint was brought because of excessive quantity of sulphite. This material is added to the meat by dissolving it in water and allowing the meat to soak it up. It resulted in one instance in a prosecution for the sale of meat containing an excessive quantity of added water.

There were five cases for the adulteration of olive oil, all resulting in conviction. The adulterant in one of these cases was tea seed oil. This was a can left over from the influx of this material during the prior year. The vendor was warned of the nature of the material but he persisted in making sales.

There were thirteen cases brought for the sale of orange beverages, the complaints being for the use of preservative without labeling the package or coloring to conceal inferiority or for misbranding by the use of the word "Orangeade." There were but six persons involved in these cases, two or more cases being brought against most of the defendants. While there were a few convictions, the cases were mostly filed. Five cases tried on the same day, involving three defendants, were dismissed by the court.

There were fifteen convictions for violation of the law pertaining to the use of sodium sulphite in sausages.

There were two convictions for the sale of sausage containing excess quantities of starch.

The sale of decomposed food is to some extent on the increase, due possibly to increase in prices. There were two convictions for the sale of rancid butter, one conviction each for the sale of decomposed eggs, mock chicken legs, and lamb patties.

There were 44 persons convicted for the sale of decomposed hamburg steak. One case involved the Pow Wow River Market, Inc. of Amesbury. Two complaints were brought against this corporation, one for the illegal use of sodium sulphite, the other for the sale of decomposed hamburg steak. There was a conviction on each case but the defendant appealed the case involving the sale of decomposed food. Subsequent to this, a letter was received from a citizen of

Amesbury relating to the purchase of some decomposed food in that market. A letter was sent to the district attorney of Essex County, quoting in part the complaint and requesting that at least the penalty of the lower court be imposed. This case went to trial in the superior court at a jury-waived session. The district attorney read the letter of the department to the judge, but the judge placed the case on file.

There was one conviction for the sale of decomposed prunes.

There were 22 convictions for the sale of decomposed sausages and there were two convictions for the use of decomposed eggs in the manufacture of food products.

There was one case under the false advertising law, involving the serving of adulterated maple syrup in a restaurant when the bill of fare advertised the material as maple syrup. This case resulted in conviction.

There were five cases for violations of the frozen desserts law and the regulations made thereunder. Three of these cases resulted in conviction. One case was dismissed by order of the court. Another case resulted in a fine of $20.00 and an appeal to the Middlesex superior court.

When this case was called in the superior court, the district attorney was informed that one of the inspectors was sick and he was requested to continue the case, which he did. The case was called a second time and a request was made for a continuance until the fall term for the same reason. This was consented to. When the fall term assembled, an inspector went to the district attorney's office and stated that the department was ready for trial as the other inspector had recovered from his sickness. He found, much to his surprise, that in the meantime the case had been nol prossed, the notation being "because of lack of evidence." Neither the district attorney nor the assistants discussed the character of the evidence with the inspectors and, in view of the fact that the lower court saw fit to convict and impose a penalty, it would seem there was sufficient evidence to at least make out a prima facie case.

There were sixteen cases for violation of the law and regulations pertaining to the bottling of carbonated nonalcoholic beverages, less than half the number of cases prosecuted during 1936. One case involved operating without a permit. Thirteen cases involved operating under unsanitary conditions and two cases involved the washing of bottles with wash waters deficient in caustic alkali. All cases resulted in conviction. One case was appealed, tried before a jury-waived session and found not guilty by the judge in the superior court.

There were five cases for violation of the sanitary food law. Two cases resulted in conviction. Two cases against one man were tried in the Chelsea court. These involved the operation of a dirty restaurant on two different occasions in the City of Revere. The complaint was brought for manufacturing foods under unsanitary conditions. When the case came to trial, the agent of the Revere board of health presented to the court a certified copy of the Revere regulations pertaining to conditions under which food may be kept or exposed for sale. The judge's attention was brought to the fact that local boards of health are not authorized to make regulations pertaining to conditions under which food is manufactured. The judge, however, was of the opinion that regulations covering conditions under which food may be stored or exposed for sale also cover manufacturing, and he dismissed the case. The inspector was instructed to make additional complaints against this defendant for violation of the regulations of the board of health of Revere. The case was not entered because at that time the man had become an inmate of one of the tuberculosis sanatoria.

Another case worthy of consideration is that against the Waldorf System, Inc. at Quincy. One of the inspectors was collecting milk in Quincy and went into the restaurant to obtain his breakfast. He was served a dish of prunes containing a cockroach. He then inspected the restaurant and found highly unsanitary conditions in existence in the place where the food was cooked and prepared. At the trial the judge requested an additional inspection, which was made by two other inspectors, and apparently the corporation had spent considerable money in renovating that portion of the restaurant where food was prepared. The judge then dismissed the case over the objections of the department.

There were eighteen cases for violation of the bakery laws and regulations, seventeen of which resulted in conviction. In three instances, a fine of $25.00 was

imposed and suspended for a year. In two instances, consisting of two cases against one defendant, there was a fine of $25.00 in the lower court on each case. The defendant appealed and in the superior court in Lawrence one case was filed. He was permitted to plead nolo contendere in the other case and was fined $25.00.

Another case involved very unsanitary conditions in the factory of the Ward Baking Company in Cambridge. In the lower court there was a plea of nolo contendere and the case was dismissed on the payment of $20.00 as costs.

There were six cases for violation of the law pertaining to shellfish, three cases resulting in conviction. One defendant was placed on probation for one year and the other two defendants were found not guilty.

There were six cases for the sale of adulterated or misbranded drugs. Four cases involved the sale of argyrol solution below the concentration specified on the label. Two cases were for the sale of low standard sweet spirit of nitre. All cases resulted in conviction.

There was one conviction for the sale of cold storage eggs not labeled as required by law.

There were only three cases for violation of the law pertaining to slaughtering. One defendant was found not guilty. One defendant was convicted and paid a fine. The third defendant was convicted; the case was placed on file on recommendation of the Commonwealth; and the defendant was removed by the department from his office of inspector.

The circumstances leading up to this case were as follows:

Mr. Bernard Frome of Dudley purchased some emaciated cattle and endeavored to have them slaughtered in two slaughterhouses, but at each slaughterhouse he was informed by the inspector that the carcasses would be confiscated. He then went to the slaughterhouse in Southbridge. Mr. Power, the inspector, notified the agent of the Society for the Prevention of Cruelty to Animals. The animals were slaughtered; the carcasses were condemned by Mr. Power, the local inspector of slaughtering; and Mr. Frome was prosecuted by the agent of the Society for the Prevention of Cruelty to Animals and was convicted and fined. The Society published in "Our Dumb Animals" an article on this situation, claiming that the lax slaughtering laws of Massachusetts were responsible for this cruelty when, in fact, the owner of the animals was satisfied they would not be passed for food in two slaughterhouses and they were actually condemned by the local slaughtering inspector in the slaughterhouse where they were killed. Instead of being a criticism of the slaughtering inspection system of the State, the circumstances were highly praiseworthy.

A few weeks later, Mr. Frome called the Department on the telephone, stating that Mr. Power had stamped a carcass which he had not seen killed. Dr. Drury, one of the veterinary inspectors of the department, investigated this case. The story as outlined was that a cow belonging to Mr. Bellerose, because of difficulty in parturition, had been killed by Mr. Frome on Bellerose's property. Bellerose asked Frome if he could dispose of the carcass and Frome replied that he did not buy unstamped meat. Mr. Bellerose then called Mr. Power and informed him that the cow had broken her leg. Mr. Power saw the dressed carcass and saw that the leg had been broken. He saw no evidence of the calf and he stamped the carcass in violation of the law. Mr. Bellerose sent the stamped carcass to Mr. Frome at a time when Mr. Frome was away from his place of business. The judge was of the opinion that Mr. Frome had not ordered the carcass to be delivered to him and that Mr. Frome had no intention of selling it. Messrs. Bellerose and Power were convicted.

There were 27 cases for violation of the law pertaining to bedding and upholstered furniture. Two persons were found not guilty although one of them was subsequently convicted about four months later. The rest of the cases resulted in conviction.

There was one conviction for obstruction of an inspector.

The results of the prosecutions will be found in Table 1. Whenever an appeal is noted in this table, the appealed case was still pending at the close of the fiscal year. Other cases which were appealed and disposed of in the superior court, if not listed as appealed, are reported in accordance with the disposition of the case as handed down in the superior court.

Samples Collected and Examined

The number of these samples is somewhat in excess of those collected and examined during 1936.

Milk

There were 6,984 samples collected and examined chemically. Of these 941 were found to be below the legal standard. From 36 samples a portion of the cream had been removed, and 24 samples were found to contain added water. This is the lowest percentage of watered samples found in any year. The large number of low standard samples is due to collecting from pasteurization plants samples of milk intended to be pasteurized. Most of this milk is purchased on its fat percentage. The higher the fat the greater the price paid for the milk. Many farmers have herds which do not produce milk up to the legal standard. Considerably more farmers have herds which produce milk above the legal standard. When this milk is mixed together in a pasteurization vat, the resulting mixture will be above the legal standard, but examination of the milk of the individual dairies in some instances will show the milk to be below the standard.

Table 2 gives a summary of the milk statistics, showing the variance in the total solids of the samples collected.

Table 3 shows the average monthly and annual composition of all the milk samples and of the samples not found to be adulterated. The lowest average for any month was during July, when 726 samples were collected, 5 samples showing the removal of cream, and 3 samples were found to contain added water. The average solids was 12.35% and the average fat was 3.80%, which is considerably above the legal standard of 12.00% solids and 3.35% fat. The average of the 6,924 samples found not to be adulterated was 12.65% solids and 3.97% fat. Of the 128 samples of certified milk examined chemically the highest sample contained 13.64% solids and 4.35% fat. The lowest sample contained 12.40% solids and 3.95% fat. The average of these samples was 12.92% solids and 4.05% fat. This compared very favorably with the requirements that this type of milk shall have an average fat of 4% over a fairly short period of time.

Massachusetts milk dealers furnish to the citizens of this State an exceptionally high quality of milk.

There were 8,090 samples of milk examined bacteriologically of which 6,392 samples conformed with the requirements.

In accordance with the Milk Regulation Board's bacteriological standards, a warning letter must be sent to the person from whom the milk with a high bacterial count was obtained, and if subsequently after a period of one week and within a period of two months additional samples are obtained and a majority of these samples show high counts, the regulations are deemed to have been violated. As a result of this proviso there have not been very many violations of the regulations relating to the bacterial counts of milk.

Seventy-four samples of certified milk were obtained, 70 of which had counts below the 10,000 maximum. The highest count for this grade of milk was 13,000. Sixty-three samples of pasteurized certified milk were obtained, 56 of which had counts below 500. The highest count was 4,000. Three hundred seventy samples of Grade A milk pasteurized were obtained. Some of these samples had counts below 100, and 258 had counts below the 10,000 maximum set by the regulations. The highest count was 490,000. The geometric means of these counts were computed for three-months intervals, December, January, and February representing the winter months. The geometric mean of the counts of this milk for the winter months was 3,900; for the spring months, 4,200; for the summer months, 7,600; and for the fall months, 5,800. There were 88 samples of Grade A raw milk collected, 73 of which had counts below the standard of 100,000. The highest count was 128,000. There is but very little milk of this grade sold in the State, and the persons producing such milk are operating under superior sanitary conditions.

One reason for certain high counts in Grade A pasteurized milk has been traced to the practice of pasteurizing the Grade A milk first and using this milk to clean the cooling and bottle filling apparatus. The ordinary pasteurized milk put through the same apparatus on the same day subsequent to the Grade A pasteurization has often been found to be lower in count than the Grade A milk.

Only 43 samples of raw milk intended to be pasteurized as Grade A milk were obtained. On the whole, the count was low, the highest count being 128,000, and 36 samples had counts below the 100,000 maximum set by the regulations.

There were 2,249 samples of pasteurized milk obtained, of which 1,356 samples had counts below 25,000, and 1,643 samples had counts below the standard of 40,000, making 606 samples with high counts, the highest count being 2,600,000. The geometric means of these analyses were computed seasonally. The counts of the winter samples had a geometric mean of 13,580; of the spring samples, 20,000; of the summer samples, 28,900; and of the fall samples, 15,900. These figures on the whole are comparatively low and are much below the standard of 40,000. One sample had a count as low as 200. Several reasons have been found for the high counts: first, because of high counts in the raw milk intended to be pasteurized; and second, because of the presence of thermophilic bacteria. Under these conditions there will be an increase in the bacterial count during the holding period. Occasionally these thermophilic bacteria are in the pasteurization apparatus and are not removed by thorough cleaning of the effluent lines, cooler, or bottle filler, and sometimes these high counts result from all these conditions.

Raw milk is not sold so extensively as it used to be, and consequently only 581 samples of this type of milk sold as such were collected by the inspectors. On the whole, the milk was very good bacteriologically, 494 samples having counts below the 400,000 standard. One sample had a count as low as 2,000, and the highest count was 16,000,000. The geometric mean was computed in this instance, and the figure for the winter months was 21,400; for the spring months, 34,000; for the summer months, 53,000; and for the autumn months, 62,700. The average for the autumn months was higher than for the other seasons, thus differing from similar figures computed for Grade A pasteurized and for pasteurized milk. The largest number of samples collected represented 4,588 samples of raw milk intended to be pasteurized. The lowest count was less than 1,000; 2,571 samples had counts less than 100,000; 3,353 samples had counts less than 250,000; and 3,737 samples had counts less than the standard of 400,000. Therefore, 851 samples had excessive bacteria counts, the highest of which was 18,000,000, which is not much above the 16,000,000 count for one sample of raw milk sold as such. The geometric means of these counts were for the winter months, 77,804; for the spring, 38,900; for the summer, 104,000; and for the fall, 89,400. These figures are higher than they were in 1936, indicating to a certain extent increased unsanitary conditions on the dairy farms from which milk is being shipped to the pasteurization establishments. Not all of the "long haul" milk has high counts. Some of these high counts were obtained from milk produced within a comparatively short distance of the pasteurization establishments, and whereas on the whole these analyses cannot be subjected to severe criticism, yet there is considerable room for improvement on the dairy farms furnishing Massachusetts with milk intended to be pasteurized. A few samples only of special milk were obtained.

Vitamin D Milk

Federal funds were available for the examination of Vitamin D milk, the work being done by Mr. Robert S. Harris. Eight samples were obtained, representing metabolized Vitamin D milk produced by feeding irradiated yeast to the cows; irradiated milk, by which the Vitamin D is produced through the influence of an electric arc on a thin film of milk; and milk containing an added Vitamin D concentrate sold not as milk but as a proprietary drug for the prevention, cure, and mitigation of disease. Of all, the samples of irradiated milk were found to carry the quantity of Vitamin D specified upon the label. One sample of the proprietary article was found to be highly deficient, and one sample of metabolized Vitamin D milk was also markedly deficient. Another sample of metabolized Vitamin D milk was very slightly deficient.

Subsequently, two of the inspectors were in a milk pasteurization establishment and saw an employee removing caps from bottles containing milk and recapping these bottles by hand with "Vitamin D" caps. The employee was unable to show any Vitamin D caps which he had removed. Unfortunately, the inspector neglected to seize a sample of the milk. The defense offered at the hearing was that the milk was for the employee's own personal use.

Certified Milk

At the present time 9 certified dairies are furnishing this grade of milk to Massachusetts consumers. During the past year three new dairies were certified in East Longmeadow, Auburn and Dartmouth. This increase in the number of certified dairies is no doubt due to the promulgation of regulations by certain cities that only pasteurized or certified milk may be sold at retail. Two out-of-State certified plants sell their product here.

The number of cows on the respective plants varies from 16 to 400. At five dairies in this State milking machines are in use. The output varies from 350 quarts daily to 5,200. At four plants a large proportion of the product is pasteurized.

Frequent inspections show the herds are free from tuberculosis, being given tests by the Division of Live Stock Disease Control. Blood testing for control of Bang's disease is carried out at regular intervals. All owners appear to be anxious for clean herds against both diseases and all reactors are removed.

Since nearly all superintendents have become experienced in producing certified milk, regulations of the American Association as well as the department are well met. As in other classes of dairies, frequent supervision other than by each Commission's representative is obviously necessary.

A large dairy in Bennington, Vermont, (Fillmore Farms) ships a small portion of its milk into this State. Hampshire Hills Dairy of Wilton, New Hampshire, finds a market for its entire output in Massachusetts. Of the 900 or more cows examined at these dairies comparatively few are found with udders showing abnormalities in physical examination.

At the larger dairies, laboratory inspection of the milk is carried out.

Investigations were made as to the merits of the phosphatase test for the detection of improperly pasteurized milk. The method adopted was the short incubation method adopted by the New York City Health Department. After about six months of study, commercial samples were obtained in many instances from pasteurization establishments where we had reason to believe the recording thermometer charts were being manipulated.

There were 809 samples of commercial pasteurized milk shown by this test to have been properly pasteurized and 45 samples were shown to have been improperly pasteurized, as a result of which efficiency tests were made in 24 plants, and in all instances the milk pasteurized in these establishments while the inspectors were present was found to have been properly pasteurized by the phosphatase test. The method is now being used as a routine measure upon all samples of pasteurized milk collected by the inspectors.

Foods Other Than Milk

There were 2,088 samples collected, representing a total of 3,464 determinations or tests. A summary of these analyses will be found in Table 4.

There were 56 samples of butter collected, of which 12 samples were illegal, 8 samples containing less than 80% fat and 4 were rancid. There is an attempt on the part of many butter manufacturers to get the fat as close to 80% as possible. The creameries determine the fat by making a determination of the moisture and the salt and assuming a fixed figure for the curd. There are, of course, possibilities of error in the determination of moisture and salt and there is a good opportunity to misjudge the percentage of curd, and consequently the analysis made of each churning invariably shows a higher fat percentage than do the department's analyses of the commercial butter when the fat is accurately determined. Of the samples, 18% had a fat content averaging 79.24%; 76 had a fat content averaging 81.46% and 28% with fat contents from 80% to 81% averaged 80.34%. Much of this butter represents interstate shipments.

One sample of dried fruit contained sulphur dioxide and the package was not labeled as required by law.

Ten samples of eggs were found in some instances to be decomposed and in other instances were advertised as fresh and were not fresh. The bulk of the decomposed eggs were broken out eggs obtained from bakeries.

The single sample of infant food reported adulterated contained rancid fat. It was submitted by a person who said he had purchased it and opened it a day or

two before bringing it to the department. The can, however, had the appearance of having been opened for some time, and an investigation of the stock in the store showed that it was all of recent delivery. The sample collected was found not to be rancid.

The three samples of maple syrup reported to be adulterated were served in restaurants, the bill of fare or advertising material claiming that the material was maple syrup.

There were 982 samples of meats and meat products examined, of which 3 samples of stew beef, 1 fowl, 1 sample of pressed ham, and 1 sample of so-called mock chicken legs, and 2 samples of lamb patties were decomposed. 89 samples of hamburg steak and 57 samples of sausages were adulterated either by being decomposed, by containing sulphite preservatives in excess of the quantity permitted by the statutes, or by the sale of such material without the required label. In addition, the sausages in some instances contained excess cereal.

The amount of sodium sulphite in the sausages was found to be from 0.02% up to 0.66%, with an average of 0.087%. Of the 57 samples examined, 48 contained not in excess of 0.1% of this material.

The amount of sodium sulphite in hamburg steak varied from 0.01% up to 0.50% with an average of 0.092%. Of the 85 samples 65 contained not in excess of 0.1% of this material. The tendency to use larger amounts appears to be more prevalent in hamburg steak than in sausages.

The starch content is determined only when a qualitative test indicates a possible excessive quantity. Those samples in which the starch was determined contained respectively, 1.30%, 1.47%, 5.33%, 5.72%, 6.27%, and 8.40% of starch. One sausage was found to contain either a tobacco cud or a cigar butt.

As a result of a complaint, a sample of split peas was purchased and the peas were found to contain mouse excrement.

Three of the 63 samples of pickles and relishes were adulterated by the use of preservatives without declaring that fact upon the label.

There were 79 samples of soft drinks purchased, of which 24 were declared to be adulterated or misbranded. In some of these instances sodium benzoate was used as a preservative, either in the drink itself or in the concentrate from which the drink was made, and the presence of the preservative was not stated upon the package. A number of cases of misbranding were found in the use of the word "Orangeade" when the material consisted of carbonated water, sugar, citric acid, orange oil, and color. Material of this character should not be labeled "Orangeade." Orangeade is orange juice, sugar, and water, the word having a similar meaning to the word "Lemonade" except that orange juice is substituted for lemon juice. The use of the term "Orange Soda" for this type of beverage is legal. The United States Secretary of Agriculture a few years ago made a ruling to the effect that the use of color in orange preparations constituted an adulteration under the law whether or not the presence of the color was declared upon the label. The interstate shippers of material of this type made shipments without the color and sent the color in a separate package. This procedure for practical purposes left the enforcement of the ruling up to the States. Attempts made to enforce this provision of the law were unsatisfactory and there were no penalties imposed on any of the cases. Most of the cases resulted in dismissal. During the month of November, the United States Department of Agriculture made a seizure in Louisiana, and the court held that the colored orange concentrate was not adulterated within the meaning of the law.

The two samples of cream reported as adulterated contained less fat than is required by the specific grade by which the samples were identified. The cream sold as light cream had a fat content varying from 20% to 32%, with an average of 24.4%, the standard for this grade of cream being 16% fat. There was but one sample of medium cream with a fat percentage of 34%, and the standard for this type of cream is 25%. The heavy cream samples varied in fat content from 33% to 44%, the average for this type of cream being 36.9%, the standard being 34%. Two samples of extra heavy cream were examined, and they contained 40% and 41% fat, respectively, the standard being 38%.

There were 109 samples of olive oil collected, of which 7 were declared to be adulterated or misbranded. Four of these samples contained cotton seed oil.

The tea seed oil racket apparently has been stopped. Two of the samples consisted of mineral oil colored and flavored in imitation of olive oil. These were sold to proprietors of small Italian stores, and when the first can was sold to a consumer, it was soon returned. The identity of the original vendor could not be obtained. Apparently the oil was peddled by persons traveling in an automobile bearing a New York registration number.

Ice Cream

The ice cream samples were, so far as the chemical composition is concerned, satisfactory, there being 566 such samples collected, all of which were found to have the necessary amount of milk solids and milk fat. Two samples of ice milk were purchased and 4 samples of ice cream containing chocolate, nuts, etc., having from 8% to 9% fat, but the balance of the samples contained from 10% to 29% fat. Fat percentages plotted on probability scales show, as in former years, the separation of ice cream into three distinct grades, one grade with a fat content between 8% and 11% representing about 11% of the samples collected; another grade with fat percentages from 12% to 18% representing 66% of the total samples; the third grade, with a fat content from 19% to 29% representing 23% of the total samples. This variance in the fat content is accompanied by a variance in the price. The average fat of all the ice cream samples was 13.33%.

There were 684 bacteriological examinations made of ice cream, the bacterial count varying from 500 up to 1,200,000, the standard set by regulation being not more than 100,000. There were 604 samples conforming to that standard. The lower quartile was 3,666. The median was 11,643, which corresponded very closely with the geometric mean of 12,549. The upper quartile was 40,000, which means that 75% of the samples contained less than half the maximum amount of bacteria permitted by the regulations.

Ice Cream Factories

There were 129 ice cream plants inspected once; 26 plants inspected twice; and 1 plant inspected three times. The following is a summary of the inspections and conditions: floors dirty in 13 instances; dirty pipelines, valves and couplings in 11 instances; dirty freezers in 17 instances; dirty holding tanks in 3 instances; and dirty toilets in 5 instances. There were 12 plants found to be operating without licenses.

Of the out-of-State plants, 2 plants in Vermont are shipping into Massachusetts. One in Burlington was inspected and found to be satisfactory. There are 8 plants in Rhode Island shipping into Massachusetts at present. There were 9 plants inspected on the first inspection; 8 on the second inspection; and 3 on the third inspection. The licenses of three of these Rhode Island plants were revoked. In 6 of the plants unsanitary conditions were found, and there were 5 instances of dirty equipment. One plant in Connecticut was inspected for the first time prior to the issuing of the license. The plant was found to be properly equipped, but the employees had not been properly instructed in the methods of cleaning up after use. There are two plants in Maine which have not been inspected except by the Boston Health Department, and 4 plants in New Hampshire which were not inspected this year but were satisfactory on prior inspections made during 1936. In New York State there were 12 plants inspected on the first trip; 3 on the second; and 2 on the third trip. One permit was revoked as a result of these inspections and one permit was refused. The plant whose permit was revoked installed new pipelines and asked for additional inspection and was then found to be in satisfactory condition for the issuing of a new permit.

Soft Drink Plants

The work of the past year shows improved conditions as compared with those of prior years. The Department was obliged to revoke four permits issued to out-of-State plants. When the original requests for the permits were received, the department accepted the inspection report of the city, town, or state where the plant was located. Experience has shown that this is not always to be relied upon. New permits were subsequently issued after these establishments had been put in conformance with the regulations. The department also revoked a Massachu-

setts permit granted by a local board of health. In this instance the owner of the plant did not live in the State; the plant was operated by a manager having no legal responsibility in connection with the business and consequently the department was unable to bring any person before the court for repeated violations of the regulations. Subsequent to revocation the plant was put in conformance with the regulations and a new permit was issued by the local board of health.

A total of 417 inspections was made in establishments bottling nonalcoholic beverages, soda water, mineral and spring water. 109 establishments were inspected once; 69 were inspected twice; 60, three times; 13, four times; and 1, seven times. A summary of these inspections shows 45 dirty plants apart from equipment. In 55 plants there was dirty equipment; in 39 the syrup room was dirty; in 49 the toilet was dirty; in 5 there was improper bottle washing, as ascertained on direct inspection; and in 5 plants the employees were dirty.

The regulations require that the bottles be washed in a 2% caustic solution. There were 59 samples of this solution obtained. The lowest caustic strength found was 0; 27% of the samples varied between 0.1% and 0.5% caustic; 44% of the samples varied between 0.6% and 1.9%; and only 27% of the samples showed full caustic strength, varying from 2.0% to 4.7%. The average of the samples containing less than 1% caustic was 0.46% caustic; and the average of the samples containing from 1% to 2% was 1.53% caustic, calculated as sodium hydroxide. Among the excuses for these conditions was one that is fast becoming stereotyped, namely, the bottles were being washed for storage purposes and were not intended to be filled until they were washed again.

Bakery Inspections

During the period commencing December 1, 1936 and ending November 1, 1937, 797 inspections were made in 566 different bakeries in 26 cities and 46 towns. Some of these inspections were to assist local boards of health.

In 81 bakeries the floors were either dirty, rough and broken, improperly constructed, or were not made of impervious material; in 113 the walls and in 102 the ceilings were either dirty, broken, papered, or were in need of painting; the sinks were dirty or leaking in 19; and there was no running hot water in 27.

Dirty tables were found in 18 places; 26 had dirty shelves; and 25 contained dirty racks; while in 24 bakeries, dirty containers and utensils were found; 36 places had unclean machines used for mixing; stock was exposed in 46; and products were exposed in 56; flour was not properly stored in 13; and in 11 places flies were numerous and screens inadequate.

Garbage was either in wooden containers or no container was provided in 51 plants; there was unnecessary debris in 30 bakeries; and 10 had contaminating surroundings.

Cats or dogs were found in 39 places and roaches or water bugs in 7 others; 29 either had no clothing room or used the bake room or toilet for hanging clothes; 9 bakers used the bakery for domestic purposes, one using it to do the family washing.

Inspectors found bakers smoking or chewing tobacco in 43 bakeries; while in 153 the toilets were either dirty, improperly located, had springless doors or doors opening directly into the bakery.

Many of the bakeries were given a second inspection to check on the violations and to see if recommendations for changes were carried out. Much improved conditions were then found in most places so that the plants are not now as bad as this report would indicate.

The majority of bakeries where bread only is baked were clean as no sticky substances are used and there is no garbage to attract flies.

In many places where the walls and ceilings were smoky and dirty, ventilating fans were recommended. Toilets were ordered cleaned and doors and vestibules constructed to comply with regulations. Many toilet doors were without springs or the springs had been disconnected. More care was urged in covering ingredients when not in use and also in keeping products covered by placing in show cases or enclosed in display windows rather than exposed on tables and shelves where they could be contaminated by the public.

Where ingredients were found stored in large cellars containing various kinds of articles and particularly in cellars with a dirt floor, the construction of closets

or a tight boarded room with a floor was recommended for the storage of all such ingredients which were to be used for food. The storage of such articles on stairways is discouraged and in toilets it is forbidden. In general, the cleanest bakeries are found in cities and towns where local inspectors have sufficient time to follow up recommendations made by themselves and state inspectors and where there is very limited or no local inspection the dirtiest bakeries are usually found.

A great many of the defects are the result of the indifference or carelessness of the employees, such as smoking, leaving goods uncovered, or screens and toilet doors open, hanging clothes in a bakery, failure to care for garbage, etc.

Some bakers pay more attention to production than they do to the upkeep of the plant. In most plants today owners welcome the visits of a state inspector and also his just criticism when conditions do not conform to regulations.

Each year fewer bakeries are found in basements and cellars. General conditions in bakeries are improving each year as the owners realize more and more the benefits to be derived from compliance with law and the demands of the public for cleaner food.

There are a large number of bakers who bring their products into Massachusetts from other States, and several Massachusetts bakers go to out-of-State bakeries to purchase some of the goods they sell in this State. Massachusetts bakers are subject to our laws, rules, and regulations, whereas their out-of-State competitors are not as this department has no authority to inspect these foreign bakeries.

A summary of the bacteriological examinations will be found in Tables 5 and 6.

Drugs

There were 268 samples of drugs collected and examined. As in recent years, the drugs showed far less adulteration than was the case fifteen or more years ago.

There were nine samples of argyrol solution not conforming to the professed standard under which they were sold. The manufacturers of this material are now putting it in solid form in bottles with directions to the druggist to add to each bottle a definite amount of water. There has been no low standard argyrol solution collected since this has been a common practice.

The other samples not conforming to the standard were only slightly below the standard except in the case of two samples of spirit of nitrous ether. One sample of olive oil was labeled "sweet oil" and was not olive oil.

A summary of the analyses of drug samples will be found in Table 7.

Milk Pasteurization Plants

There were 744 plants inspected, 1,445 inspections being made, usually with two men at each inspection. There were 16 plants showing unsanitary condition of premises, 4 to a minor extent only.

Unsanitary condition of apparatus was found to a large extent in 18 plants and to a lesser extent in 16 plants. In 16 plants the bottles were not being properly sterilized. The regulations require that if leak escape valves are not used they must be disconnected from the piping during the holding period, and in 13 plants violations of this character were detected. In 77 plants the recording thermometer charts did not bear the comparative readings of the recording thermometer and the mercury thermometer, and in 29 plants the charts had not been dated. There were 6 plants in which it was definitely proved that the recording thermometer charts had been manipulated, and this was suspected in 34 other plants. Subsequent examination by the phosphatase test of the milk sold by many of these plants enabled the department to successfully prosecute them. In 69 plants about 200 charts showed either low temperatures or short time or both. Bottles holding pasteurized milk were found to be capped by hand in 9 instances, and in 18 instances improper type of caps were being used.

The recording thermometers were found to be broken in 6 plants and the mercury thermometers were broken in 4 plants.

The result of the year's work shows a decided improvement in the average pasteurization establishment. In too many instances, however, incompetent persons are employed to do the pasteurizing, and it is believed that if operators of these plants were under State license, the violations of the pasteurization law and regulations would be considerably curtailed.

Efficiency Tests on Pasteurization Establishments

In many instances these were made in connection with investigations of alleged improper pasteurization due to a positive phosphatase in the pasteurized milk. Bacteria counts in milk from the vat prior to pasteurization, 460,000; 10 minutes at 142°, 140,000; 15 minutes at 142°, 7,000; 20 minutes at 142°, 5,000; 30 minutes at 142°, 5,000; one bottle from the fourth case, 7,000.

The following example shows results from a plant receiving milk with an exceptionally high bacteria count: raw milk, 2,100,000; at 142° for 5 minutes, 330,000; at 142° for 10 minutes, 161,000: at 142° for 15 minutes, 130,000; at 142° for 20 minutes, 100,000; at 142° for 30 minutes, 35,000; milk from the bottle, 39,000.

Milk with a high count pasteurized in another establishment. (This shows an 86% drop in the first 5 minutes of pasteurization.) Raw milk, 4,900,000; 142° for 5 minutes, 390,000; 10 minutes at 142°, 270,000; 15 minutes at 142°, 240,000; 20 minutes at 142°, 160,000; 30 minutes at 142°, 165,000; milk from the bottle, 200,000; the last portion of milk over the cooler, 100,000. All of these figures show a pronounced drop in the bacteria count of the milk as soon as the temperature has reached 142°. Many milk dealers have claimed that they were pasteurizing milk properly because the milk showed a low bacteria count. This is not the case. In one instance where the department obtained positive evidence of manipulating of the recording thermometer together with a positive phosphatase test and possibly not more than ten minutes holding at the pasteurizing temperature, the milk on sale had a count of less than 1,000.

Restaurants

Two additional inspectors were put on for the purpose of making restaurant inspections. Both of these inspectors subsequently resigned and the positions were abolished. The first inspections during the months of July, August, and September showed in general that there was room for improvement in these places. There were 532 inspections made in Boston, Beverly, Chelsea, Lynn, Revere, Brookline, Watertown, Natick, Framingham, Waltham, and Worcester. Of these restaurants, 184 were said to be in good condition; 185 in fair condition; and 163 in poor condition. In 102 instances the kitchen utensils were dirty. In 114 instances the ice boxes were dirty. In 182 instances there were excessive quantities of flies, cockroaches, or both. In 129 instances the toilets were dirty or else were directly connected with the rooms in which cooking was carried on. The floors, walls, and ceilings were dirty in 129 instances. The storerooms and cellars were dirty in 101 instances, and in 145 instances there was improper disposal of garbage and rubbish. There were 66 confiscations of decomposed food, amounting in all to 259 pounds. Later in the year, reinspections were made of most of these premises and the conditions were found to have been materially improved.

Sanitation of Crab Meat and Lobster Meat Establishments

Early in August there were reports of sickness apparently traced to the consumption of crab meat and lobster meat. A thorough sanitary inspection was made of practically each of the establishments where this type of food is prepared, and in addition samples of meat were collected for bacteriological examination. The result of the investigation indicated that there is potential danger in the consumption of this type of food. The shellfish are properly cooked but in many instances the cooked fish are placed in the same containers which held the live shellfish, thereby presenting an opportunity for recontamination by means of the shells. Lobsters are frequently kept alive in tanks containing running salt water, the salt water in some instances being obtained from a sewage polluted source, in other instances being obtained from a source which is not sewage polluted. The bulk of the shellfish causing the sickness apparently came from Boston people. The lobster meat is separated into two classes, depending upon the part of the animal from which it is obtained. The meat from the claws and from the tails is removed from the shell with but very little handling, the shells being cracked and the meat shaken out and kept separate from the rest of the meat. Salads, etc., made from this meat bring the highest price, and there was very little complaint of sickness from this class of meat. The meat from the knuckles is necessarily removed by hand. The meat from the legs is removed by a clothes wringer, and

the meat from the ribs is picked out by hand. Some dealers do not handle this type of meat but sell the so-called bodies, consisting of ribs and legs, to persons who will open and remove the meat.

The following is a report characteristic of one of these establishments:

The cleaning room is upstairs in a two-story wooden building, 16 girls being engaged in the shucking. They furnish their own clothing, do not wear uniforms, but some of the girls have their hair covered. The girls work at rough wooden benches with a small block of marble upon which to crack the shells of the crabs. This meat is then removed from the shells by hand with the aid of a small spatula. The waste material is dropped through a hole in the center of the bench, under which is placed a wooden barrel. The dirty wooden barrels are used again for waste as well as for containers of newly boiled crabs. The crab meat after being removed is placed in new cans. There are holes punched into these cans and the filled cans are then rinsed in a warm salt solution. There is a considerable quantity of fresh boiled crab meat in the shucking room not iced. The benches are washed each day with a disinfectant solution and hot water. They are replaced twice a year. There was an enamel sink in the corner with hot and cold water used in rinsing the cans. There were two toilets located in a separate room. These were not very dirty but they could have stood a little cleaning. The toilet bowls and wash stands were not particularly clean. No soap or towels were there but the owner said each employee had her own soap and towels. There was no hot water at the wash stands. The water was from a public water supply and sewage was disposed of to a public sewer. There were no screens, the windows were open, and yet there were very few flies.

There were 29 samples of this material collected for bacteriological examination and 27 of them showed exceptionally high bacterial content. Attempts made to isolate by means of Stone's method a hemolytic staphylococcus which will cause sickness were unsuccessful. Many of the samples contained colon bacilli, the examinations being made either by litmus agar, by endo plates, or by lactose broth. In one instance a blood plate showed positive hemolytic colonies. We were unable to make an exact identification of these bacteria. Three different types of organisms were found in one such colony. The endo plates showed as high as 60,000 colonies in some instances. The total bacteria count in many instances varied from 1,000,000 up to 21,000,000. In order to ascertain whether or not the bacteria were inherent in the live crabs or were added after cooking, twelve live crabs were obtained and the meat from a claw was removed under aseptic conditions. No bacteria were found in any of this meat when examined by Stone's media by the endo plates and by the lactose broth. Samples of commercially cooked lobster were obtained and the intestinal tract was examined for colon bacilli with negative results. Apparently the commercial cooking is sufficient to furnish satisfactory protection for the consumer. Apparently safety demands that the consumer purchase lobsters or crabs in the shell either cooked or alive. In the latter instance, he should cook them and in both instances should open them.

Slaughtering Inspection

There were very few violations noted in slaughtering inspection throughout the year. The usual routine work was performed relative to consideration of nominees for the position of local inspector of slaughtering and inspection of slaughterhouses.

A summary of the inspections made by the local slaughtering inspectors will be found in Table 8. This does not include inspections made by the City of Boston or in establishments under United States inspection.

For some years, the State has been engaged in the intensive testing of cattle for tuberculosis and the results of this testing should produce a reduction in the confiscation by reason of generalized tuberculosis of carcasses of cattle and hogs. Most of the cattle slaughtered in Massachusetts slaughterhouses are dairy cattle. Most of the cattle slaughtered in the United States inspected houses in the entire United States are steers of those breeds usually raised for beef purposes.

Twenty years ago, the Massachusetts confiscations for tuberculosis showed a higher percentage than those reported by the United States Bureau of Animal Industry for the entire country. In 1917, 1.9% of the cattle killed under Massachusetts inspection were condemned because of generalized tuberculosis and 0.16%

of the hogs were condemned for the same reason. Approximately 30,000 cattle are now killed each year in Massachusetts. During the past six years the number of cattle condemned for generalized tuberculosis has decreased from a maximum of 583 in 1932 to 29 in 1937.

The percentages of confiscations each year from 1932 to date are, respectively, 1.7%, 1.6%, 0.9%, 0.14%, 0.11%, and 0.10%. The figures for the same period for hogs are 0.19%, 0.13%, 0.07%, 0.24%, 0.07%, and 0.03%. These figures give a striking illustration of the economic value of health work as pertaining to the tuberculin testing of cattle.

Enforcement of the Law Pertaining to Articles of Bedding and Upholstered Furniture

There was a change in the statutes permitting the use of so-called garnetted clippings in the manufacture of upholstered furniture without putting the "Secondhand" label on the furniture. The use of this material, however, as new material would constitute a violation of the law in case it was used in an article of bedding.

During the past year the usual examinations of mattress and upholstered furniture filling have been carried on by means of examination under ultra violet light, the determination of urea, and occasionally a determination of starch. The urea in the material found to be new material varied from 0 up to 0.86 milligrams per 100 grams. One sample contained as high as 1.18 milligrams of urea. This is within the limits of what may be expected in new material, but the ultra violet light showed that there may have been an extremely slight admixture of secondhand material.

One sample of kapok was found by the ultra violet light to be new and contained no urea. Four samples of down were examined and were found to contain from 73% to 85% of feathers. Three samples of shredded cloth free from urea were found to contain starch. This material is secondhand within the meaning of the law. One mixture of wool and cotton was found to have more urea than would be expected for new material and also contained starch.

There were a number of secondhand samples of cotton obtained, the urea content of this material varying from 2.35 up to 26.5 milligrams per 100 grams.

Much of the above-mentioned secondhand material was actually mixtures of new with secondhand material, very little of it consisting entirely of secondhand material.

Some rather interesting mixtures were found in material not properly labeled. A mixture of wool, jute, hair, and cotton was labeled "white cotton." A piece of material labeled "all wool" contained 19% of cotton. Another sample labeled "wool" contained 4.6% of cellulose fibres. Under the law passed in 1937, new cloth not manufactured into any other article can be torn down, made into a felt, and used in upholstered furniture and bear a "New" label. It cannot, however, be used as a mattress filling unless it bears the "Secondhand" label.

Sterilization of Secondhand Material

Since statutes were enacted requiring all used secondhand material to be sterilized, licenses have been taken by eight establishments. One fumigating concern in Hingham is not connected with the bedding business but has treated hundreds of tons of material for manufacturers who have not installed fumigating chambers.

Sterilization plants connected with bedding factories are located in Worcester (4), Fitchburg (1), Beverly (1), Malden (1), and Somerville (1). Since the above law went into effect the utilization of actually used material as filling has shown a marked decrease. Mill wastes and converted materials not actually used are more often employed as fillings. The continued demand for inner springs with felt excelsior and sisal is another deterrent against secondhand fillings.

It is pleasantly noted that secondhand material camouflaged as new in the furniture field of this Commonwealth is definitely of the past. By far the larger percentage of furniture stores in the State do not handle secondhand mattresses and it is only in the furniture stores catering to the poorer class of purchasers that the red tagged secondhand mattresses are purchased. This type of cheap mattress is no longer wanted in well established stores, owners of which are educating their patrons on the poor economy exercised in buying this type of bedding.

During the fiscal year from December 1, 1936 to November 30, 1937, sterilizing has been done at bedding factories and one solely for fumigating all material including bedding. Samples have been collected before the material was placed in the fumigating chamber and a count of bacteria made at the food and drug laboratory. Hydrocyanic acid gas has been in use at one plant. At others formaldehyde has been used and sulphur dioxide has also been employed in a few plants. In factories where air-tight chambers have been installed good results have been obtained.

Some manufacturers have tried to circumvent the law by using "Sterilized" tags on mattresses never subjected to chemical treatment. A sample taken from one mattress showed a count of 1,780,000 colonies per gram. One factory had a pile of mattresses tagged as sterilized. Upon questioning, the owner admitted they were not sterilized but would be before being shipped. In this case, as in many others, the owners instead of honestly complying with the law place the burden of proof on the Commonwealth to prove the mattresses are illegally marked.

Results of tests of bedding material before and after treatment are shown by the following bacteria counts:

Sample	*Before*	*After*
1	88,000	12,000
2	540,000	16,000
3	107,000	26,000
4	750,000	18,000
5	1,600,000	5,000

Samples of sterilized material taken showed counts of 2,000; 72,000; 4,000; 24,000; 8,000; and 80,000.

The enactment of the law requiring sterilization has caused many manufacturers to depart from the use of actually used secondhand material. Instead mill wastes and low grade cotton by-products are utilized.

Licensing of Dealers in Wood Alcohol

Persons selling this material are required to take a license from the board of health of the town where the sales are made. The fee for the license is one dollar. Persons, however, have the option of taking out a State license, the fee for which is ten dollars, and if such persons are doing business in ten or more towns, a State license is usually obtained.

There has been a recent change in methods of operating gasoline stations of the large distributors. These are no longer operated as branches of the corporation but are leased to other persons who operate them. Under this system, if wood alcohol anti-freeze is sold at these leased stations, it is necessary for the corporation that distributes the material to have a license, which in this case is usually a State license, and it is also necessary for the lessee of the station to obtain a license from the town. There are 146 persons with State licenses and it is estimated that at least 95% of persons who require State licenses have such licenses. In making investigations as to the necessity for State licenses, the inspectors have found considerable laxity both on the part of the local boards of health and of the local dealers in issuing and obtaining these local licenses. While many boards of health are properly enforcing this law, in some instances boards of health have refused to issue licenses to persons who asked for them and needed them. Boards of health have issued licenses to persons to sell denatured alcohol anywhere in the State, notwithstanding the fact that that particular law was repealed a few years ago. Some of the persons having State licenses have furnished to their lessees photostat copies of the State licenses, and occasionally the local boards of health have assumed that the place is licensed. In a few instances attempts were made on the part of distributors to avoid the taking out of a license on the ground that they were agents for licensed manufacturers. It was necessary in three instances to obtain sufficient evidence to warrant applying for a complaint in court before these manufacturers took out State licenses.

There has been a great increase in the use of wood alcohol anti-freeze preparations, and because of failure to enforce this law pertaining to licensing of retail

vendors, the cities and towns of the State have lost considerable revenue. The agent of the board of health of one town informed this department that in one day he visited all the gasoline stations in that town and collected $40.00 in license fees.

Cold Storage

Tables 9, 10, 11, and 12 show the usual statistics relative to the amounts of food placed in storage and amounts of food on hand in storage.

Tables 13, 14, and 15 show the action of the department on requests for extension of time in storage. Whenever these extensions were granted it was because the articles were in proper shape for further storage.

In Table 16 will be found the amounts of food condemned in storage warehouses, markets, restaurants, etc.

Table 17 gives a summary of the bakery inspections.

Table 18 gives a summary of the analysis of miscellaneous samples.

A summary of the liquor report will be found in Table 19, and Table 20 gives a summary of drugs, chemicals, and poisons examined for police departments.

The total number of samples examined does not give an adequate idea of the extent of the laboratory work. The examination of some samples is quite simple, requiring only one qualitative test or one determination. The examination of samples of a different type may require from six to ten qualitative tests or determinations.

The following table gives the number of samples collected and the total number of determinations made in performing the analyses.

Summary of Analyses

Character of Samples	Total Number of Samples	Number of Individual Tests or Determinations
Milk, chemical	6,984	14,718
Milk, bacteriological	8,089	26,292
Foods, chemical	2,088	3,464
Foods, bacteriological	875	1,814
Drugs	268	364
Miscellaneous	158	497
Samples from police departments:		
Drugs, narcotics, etc.	53	192
Liquor	595	1,310
Total	19,110	48,650

Table I.—*Prosecutions for Violations of the Food and Drug Laws*

For Sale of Milk not of Good Standard Quality

Name	Address	Court	Date	Result
Coulouris, Emmanuel	Boston	Boston	Dec. 1, 1936	Conviction
Joacquin, John	Fall River	Fall River	Jan. 14, 1937	Conviction
Joacquin, John	Fall River	Fall River	Jan. 14, 1937	Conviction
McMahon, Francis P.	Lowell	Lowell	May 14, 1937	Conviction
Mirazios, Christos	Boston	Boston	Dec. 15, 1936	Conviction
Trearchis, Constantine	Woburn	Woburn	Mar. 5, 1937	Conviction

For Sale of Milk from which a Portion of the Cream Had Been Removed

Frates, Myron	New Bedford	New Bedford	May 26, 1937	Dismissed
Mayranen, Wilko	Westminster	Gardner	July 8, 1937	Conviction
Miller Drug Company, Incorporated, The	Roxbury	Roxbury	Jan. 27, 1937	Conviction

For Sale of Milk Containing Added Water

Asadorian, David	Haverhill	Haverhill	May 28, 1937	Conviction
Chamberlain, Joseph	Wenham	Salem	Jan. 12, 1937	Conviction
Clayton, Albert E.	Framingham	Framingham	Feb. 24, 1937	Conviction
Souza, Joseph C.	Westport	New Bedford	July 8, 1937	Conviction

For Sale of Milk without a Milk License

McMahon, Francis P.	Lowell	Lowell	May 14, 1937	Conviction

For Delivery of Milk in a Dirty Bottle

Woodland, Charles L.	Watertown	Cambridge	Oct. 27, 1937	Conviction

Milk Incorrectly Labeled as to Date of Production or Date of Pasteurization

Holden, Robert T.	Bennington, Vt.	Pittsfield	Feb. 25, 1937	Conviction
Manning, Harriett	Milton	Quincy	Apr. 8, 1937	Discharged
Smith, John J.	South Boston	South Boston	Jan. 7, 1937	Dismissed

Representing Unpasteurized Milk as Pasteurized

Arruda, Manuel	Fall River	Fall River	Nov. 5, 1937	Conviction
Boucher, Louis J.	Worcester	Worcester	Oct. 15, 1937	Conviction
Corkery, John J.	Cambridge	Cambridge	Mar. 30, 1937	Discharged
Grout, Francis	Sherborn	Framingham	Mar. 29, 1937	Conviction
Henshaw, Wallace L.	Salem	Salem	Sept. 23, 1937	Conviction
Hiller, Howard B. (2 counts)	Rochester	Middleboro	Aug. 24, 1937	Conviction
Hiller, Robert B. (2 counts)	Rochester	Middleboro	Aug. 24, 1937	Dismissed
Joacquin, Mary	Fall River	Fall River	Jan. 14, 1937	Conviction
Kydd, John	Lowell	Lowell	Nov. 10, 1937	Conviction
La Croix, Frank	Hingham	Hingham	Mar. 19, 1937	Conviction
Rabinovitz, Arthur	Chelsea	Chelsea	Nov. 26, 1937	Conviction
Rabinovitz, Arthur	Chelsea	Chelsea	Nov. 26, 1937	Conviction
Schiavi, Leopold	Framingham	Framingham	Mar. 1, 1937	Conviction
Schwartz, Jennie	Chelsea	Chelsea	Nov. 26, 1937	Conviction
Spittle Brothers Dairy, Incorporated	Gloucester	Gloucester	Sept. 24, 1937	Conviction
Spittle Brothers Dairy, Incorporated	Gloucester	Gloucester	Sept. 24, 1937	Conviction

For Violation of Pasteurization Law and Regulations

Anzivino, Leonard	Cochituate	Framingham	Aug. 6, 1937	Conviction
Beaubien Brothers	Montague	Greenfield	Sept. 10, 1937	Dismissed
Campbell, John	Haverhill	Haverhill	Mar. 12, 1937	Conviction
Eastland Farms, Inc.	Malden	Malden	Sept. 16, 1937	Conviction
Fedele, Salvatore S.	Somerville	Somerville	Oct. 26, 1937	Discharged
Frates, Myron	New Bedford	New Bedford	May 26, 1937	Conviction
Goldman, Morris	Chelsea	Chelsea	Apr. 7, 1937	Conviction
Harnisch, Ernest	Methuen	Methuen	Oct. 22, 1937	Conviction [1]
Jalbert, Joseph A.	Southbridge	Southbridge	June 25, 1937	Conviction
Joacquin, Mary	Fall River	Fall River	Jan. 14, 1937	Conviction
Kananen, Herman	East Bridgewater	Brockton	Sept. 1, 1937	Conviction [2]
Schiavi, Leopold	Framingham	Framingham	Mar. 1, 1937	Conviction
Schwartz, Jennie	Chelsea	Chelsea	April 8, 1937	Discharged

For Violation of the Milk Grading Regulations

Alta Crest Farms, Inc.	Spencer	Worcester	July 16, 1937	Conviction
Campbell, John B.	Haverhill	Haverhill	April 20, 1937	Conviction
Dufresne, William	Granby	Holyoke	April 9, 1937	Conviction
Frates, Myron	New Bedford	New Bedford	May 26, 1937	Conviction
Kordolski, John	Salem	Salem	Mar. 26, 1937	Conviction
Law, Arthur E.	Methuen	Lawrence	July 2, 1937	Conviction
Merrifield, Ralph A.	Athol	Greenfield	Mar. 11, 1937	Conviction
Rodden, Hugh	Salem	Salem	April 6, 1937	Conviction
Rogers, Joseph A.	Haverhill	Haverhill	April 30, 1937	Conviction
Seymour, Thomas	Lynn	Lynn	Oct. 28, 1937	Conviction

BUTTER
(Below the Legal Standard)

White, Abraham	Chelsea	Boston	Oct. 7, 1937	Conviction

[1] Guilty, $100 fine; suspended to April 22, 1938.
[2] Guilty; probation until May 27, 1938.

Hamburg Steak
(Violation of the Law Relative to Use of Sodium Sulphite in Meat and Meat Products)

Andelman, Coleman	Arlington	Cambridge	Feb. 4, 1937	Conviction
Bendell, Samuel	Roxbury	Roxbury	Jan. 13, 1937	Discharged
Bernstein, Hyman	Holyoke	Holyoke	June 15, 1937	Conviction
Bernstein, Morris	Roxbury	Roxbury	Dec. 28, 1936	Conviction
Buonaugurio, Camillo	Somerville	Somerville	Jan. 21, 1937	Conviction
Cohen, Abram J.	New Bedford	New Bedford	July 30, 1937	Conviction
Cohen, Harry	East Boston	East Boston	Sept. 18, 1937	Conviction
Gordon, Samuel	New Bedford	New Bedford	April 28, 1937	Conviction[1]
Hefferon, Sam	Arlington	Cambridge	Feb. 4, 1937	Dismissed
Hurovitz, Jacob	Boston	Boston	April 7, 1937	Conviction
Lajeunesse, Eugene	New Bedford	New Bedford	July 23, 1937	Conviction
Lipsky, Samuel	Brookline	Brookline	Oct. 14, 1937	Dismissed
Nayor, Israel	Dorchester	Dorchester	Aug. 6, 1937	Conviction
Norwood Market, Inc.	Everett	Malden	May 11, 1937	Conviction
Norwood Provision Company, Inc.	Everett	Malden	April 22, 1937	—[2]
Paradis, Fernando	Holyoke	Holyoke	June 15, 1937	Conviction
Piscione, Pasquale	Cambridge	Cambridge	Dec. 14, 1936	Conviction
Piscione, Pasquale	Somerville	Somerville	Jan. 21, 1937	Conviction
Powow River Meat Market, Inc.	Amesbury	Amesbury	Mar. 4, 1937	Conviction
Rounsevell, Inc., P. W.	Boston	Boston	Feb. 2, 1937	Conviction
Shafran, Henry	Brookline	Brookline	Jan. 15, 1937	Conviction
Shafran, Henry	Brookline	Brookline	Oct. 27, 1937	Discharged
Shavetsky, Jack	Revere	Chelsea	Jan. 8, 1937	Conviction
Simon, Samuel	Dorchester	Dorchester	Aug. 6, 1937	Conviction
Spector, Morris	Waltham	Waltham	April 21, 1937	Conviction
Stuart, David	Framingham	Framingham	Dec. 4, 1936	Conviction
Waltham Provision Company, Inc.	Waltham	Waltham	April 21, 1937	Conviction
Yogjian, Aram	Arlington	Cambridge	Feb. 4, 1937	Dismissed[3]

Hamburg Steak
(Contained added water)

Waltham Provision Company, Inc.	Waltham	Waltham	April 21, 1937	Conviction

Olive Oil
(Adulterated with Cottonseed Oil)

Booras, Paul	Lynn	Malden	June 8, 1937	Conviction
Ramboli, Ada	Everett	Malden	Nov. 12, 1937	Conviction

Olive Oil
(Adulterated with Tea-seed Oil)

Girdis, Steve	Boston	Boston	April 1, 1937	Conviction

Olive Oil
(Misbranded Oil)

Booras, Paul	Lynn	Malden	June 8, 1937	Conviction
Ramboli, Ada	Everett	Malden	Nov. 12, 1937	Conviction

Orange Beverage
(Contained Benzoate not Marked)

Ginsberg, Barnet	Roxbury	Roxbury	Dec. 30, 1936	Dismissed

Orange Beverage
(Colored to Conceal Inferiority)

American Dry Ginger Ale Company, Inc.	Roxbury	Roxbury	Dec. 30, 1936	Dismissed
Chrusciel, Jacob	Everett	Boston	May 25, 1937	Conviction
Ginsberg, Barnet	Roxbury	Roxbury	Dec. 30, 1936	Dismissed
Podgur, Arthur	Boston	Boston	May 25, 1937	Conviction
Red Star Beverage Company	East Boston	Boston	May 25, 1937	Conviction
Red Star Beverage Company	East Boston	Boston	May 25, 1937	Conviction

[1] Appealed.
[2] Corporation was defaulted. Penalty of $50.00 imposed on a writ by court.
[3] Defendant died after case was entered.

For Sale of Adulterated or Misbranded Foods Other Than Milk and Milk Products—Concluded

Orangeade
(Misbranding of Orangeade)

American Dry Ginger Ale Company, Inc.	Roxbury	Roxbury	Dec. 30, 1936	Dismissed
Chrusciel, Jacob	Everett	Boston	May 25, 1937	Conviction
Ginsberg, Barnet	Roxbury	Roxbury	Dec. 30, 1936	Dismissed
Red Star Beverage Company	East Boston	Boston	May 25, 1937	Conviction
Red Star Beverage Company	East Boston	Boston	May 25, 1937	Conviction
Sears, Joseph	Rockport	Gloucester	April 12, 1937	Conviction

Sausage
(Violation of the Law Relative to Use of Sodium Sulphite in Meat and Meat Products)

Balletto, Anthony	Cambridge	Cambridge	Dec. 14, 1936	Conviction
Barsalon, W. A.	Holyoke	Holyoke	June 15, 1937	Conviction
Buonaugurio, Camillo	Somerville	Somerville	Jan. 21, 1937	Conviction
D'Aurora, Venauzio	Marlboro	Marlboro	April 16, 1937	Conviction
Giovino, Anthony	Cambridge	Cambridge	Dec. 14, 1936	Conviction
Lydeotes, Harry	Cambridge	Cambridge	May 20, 1937	Conviction
Macera, John	Somerville	Somerville	Feb. 8, 1937	Conviction
Martin, George	Springfield	Springfield	Feb. 5, 1937	Conviction
Moskal, John	Ware	Ware	Feb. 19, 1937	Conviction
Pettrini Company, Inc., D.	Boston	Boston	Feb. 15, 1937	Conviction
Piscione, Pasquale	Somerville	Somerville	Jan. 21, 1937	Conviction
Ruggieri, John F.	Somerville	Somerville	Jan. 28, 1937	Conviction
Salvick, Joseph	Springfield	Springfield	Feb. 5, 1937	Conviction
Solin's Market, Inc.	Chicopee	Chicopee	July 27, 1937	Conviction
Spitzler Company, Inc., The Oscar	Holyoke	Holyoke	Feb. 26, 1937	Conviction

Sausage
(Contained starch in excess of 2 per cent)

Cudahy Packing Company	Worcester	Framingham	Mar 16, 1937	Conviction
Cudahy Packing Company	Worcester	Worcester	April 9, 1937	Conviction

For Sale of Decomposed Food

Butter

Folsom's Market, Inc.	Roxbury	Roxbury	June 21, 1937	Conviction
Winer, Nathan	Springfield	Springfield	April 8, 1937	Conviction

Eggs

Lesbner & Sons, Inc.	Dorchester	Dorchester	Sept. 9, 1937	Conviction

Mock Chicken Legs

Carl's Market, Inc.	Cambridge	Cambridge	May 27, 1937	Conviction

Lamb Patties

Economy Grocery Stores Corporation	Milford	Milford	Mar. 22, 1937	Conviction

Hamburg Steak

Alex's Market, Inc.	Worcester	Worcester	Dec. 2, 1936	Conviction
Andelman, Abraham	Cambridge	Cambridge	May 27, 1937	Conviction
Andelman, Coleman	Arlington	Cambridge	Feb. 4, 1937	Conviction
Bank, Jacob G.	Cambridge	Cambridge	May 20, 1937	Conviction
Buonauguiro, Camillo	Somerville	Somerville	Jan. 21, 1937	Conviction
Consumer's Provision Stores, Inc.	Worcester	Worcester	Dec. 2, 1936	Conviction
Corey, Arthur	Lawrence	Lawrence	Feb. 5, 1937	Conviction
De Luca, Rose	Somerville	Somerville	Jan. 21, 1937	Conviction
Dubrow, Charles	Lynn	Lynn	April 22, 1937	Conviction
Economy Grocery Stores Corporation	Boston	Boston	Aug. 16, 1937	Conviction
Flink, Louis	Fall River	Fall River	Dec. 30, 1936	Conviction
Folsom's Market, Inc.	Roxbury	Roxbury	June 21, 1937	Conviction
Ginsberg, David	Worcester	Worcester	Aug. 12, 1937	Conviction
Gold, Benjamin	Malden	Malden	June 23, 1937	Conviction
Gorodetzer, Barney	Dorchester	Dorchester	Dec. 9, 1936	Conviction
Gorodetzer, Barney	Dorchester	Dorchester	Dec. 9, 1936	Conviction
Hefferon, Sam	Arlington	Cambridge	Feb. 4, 1937	Dismissed
Heishon, Benjamin	Dorchester	Dorchester	Sept. 9, 1937	Conviction
Kessler, Keve	Malden	Malden	June 23, 1937	Discharged
Levine, Bernie	Chelsea	Chelsea	Sept. 23, 1937	Discharged
Liberty Market, Inc.	Newburyport	Newburyport	Feb. 25, 1937	Conviction [1]
Main Public Market, Inc.	Fall River	Fall River	Mar. 22, 1937	Conviction
Main Public Market, Inc.	Fall River	Fall River	Sept. 3, 1937	Conviction
Maloney, Wilfred	Haverhill	Haverhill	Mar. 11, 1937	Conviction
Massachusetts Mohican Company, The	Allston	Brighton	Oct. 29, 1937	Conviction

[1] Guilty, fined $25.00; suspended one year.

For Sale of Decomposed Food—Concluded

Hamburg Steak — *Concluded*

New Bedford Public Market, Inc.	New Bedford	New Bedford	April 28, 1937	Conviction
Norwood Market, Inc.	Everett	Malden	May 11, 1937	Conviction
Norwood Provision Company, Inc.	Everett	Malden	April 22, 1937	—[1]
Pecione, Pasquale	Somerville	Somerville	June 24, 1937	Conviction
People's Public Market, Inc.	Fall River	Fall River	April 5, 1937	Conviction
Powow River Meat Market, Inc.	Amesbury	Amesbury	Mar. 4, 1937	—[2]
Razzaboni, Fred	Somerville	Somerville	Jan. 21, 1937	Conviction
Rotenberg, Samuel	Chelsea	Chelsea	Jan. 20, 1937	Conviction
Routhos, Ludwig	Holyoke	Holyoke	June 8, 1937	Conviction
Ruggieri, John F.	Somerville	Somerville	June 16, 1937	Conviction
Saievitz, Jacob	Chelsea	Chelsea	Sept. 23, 1937	Discharged
Sichol, Adam	Southbridge	Southbridge	May 7, 1937	Conviction
Sigda, Frank	Holyoke	Holyoke	April 30, 1937	Conviction
South Cash Market, Inc.	Boston	Boston	Mar. 18, 1937	Conviction
Spector, Morris	Waltham	Waltham	Dec. 3, 1936	Conviction
Spitzler Company, Inc., The Oscar	Holyoke	Holyoke	June 8, 1937	Conviction
Stolzberg, Benny	Haverhill	Haverhill	Jan. 8, 1937	Conviction
United Food Stores of Webster, Inc.	Webster	Webster	Dec. 1, 1936	Conviction
Waldman, Joe	Roxbury	Roxbury	Dec. 18, 1936	Conviction
Waltham Provision Company	Waltham	Waltham	Dec. 3, 1936	Conviction
Waltham Provision Company	Waltham	Waltham	Dec. 29, 1936	Conviction
Waltham Provision Company	Waltham	Waltham	Dec. 29, 1936	Conviction
Ward, Louis	Brookline	Brookline	Oct. 14, 1937	Conviction[3]
Weiss, Rose	Ware	Ware	Mar. 9, 1937	Conviction
White Star Foods, Inc.	Everett	Malden	April 22, 1937	Conviction

Prunes

Leshner & Sons, Inc.	Roxbury	Roxbury	Sept. 17, 1937	Conviction

Sausage

Andelman, Abraham	Cambridge	Cambridge	May 27, 1937	Conviction
Arrick, Hyman	Chelsea	Chelsea	June 18, 1937	—[4]
Banks, Jacob G.	Cambridge	Cambridge	May 20, 1937	Conviction
Beach, Henry	North Attleboro	Attleboro	April 1, 1937	Conviction
Bernstein, Max	Gardner	Gardner	Mar. 18, 1937	Conviction
Bond, George F.	Marlboro	Marlboro	April 16, 1937	Conviction
Carl's Market, Inc.	Cambridge	Cambridge	May 27, 1937	Conviction
Cohen, Harry	East Boston	East Boston	Sept. 18, 1937	Conviction
Corey, Arthur	Lawrence	Lawrence	Feb. 5, 1937	Conviction
Fiorentino, Frank	Somerville	Somerville	Jan. 28, 1937	Conviction
Ginsberg, David	Worcester	Worcester	Aug. 12, 1937	Conviction
Great Scott Food Market, Inc.	Brockton	Brockton	Feb. 26, 1937	Conviction
Gross, Benjamin	Somerville	Somerville	Feb. 8, 1937	Conviction
Mohican Market, Inc.	Holyoke	Holyoke	June 8, 1937	Conviction
Moskal, John	Holyoke	Holyoke	April 16, 1937	Conviction
Rich, Abraham	Lynn	Lynn	Feb. 2, 1937	Conviction
Sigda, Frank	Holyoke	Holyoke	April 30, 1937	Conviction
Spitzler Company, Inc., The Oscar	Holyoke	Holyoke	Feb. 26, 1937	Conviction
Tillman, Isaac	Springfield	Springfield	July 1, 1937	Conviction
United Food Stores of Webster, Inc.	Webster	Webster	Sept. 9, 1937	Conviction
Waltham Provision Company	Waltham	Waltham	Dec. 29, 1936	Conviction
White Star Foods, Inc.	Waltham	Waltham	April 21, 1937	Conviction
White Star Foods, Inc.	Waltham	Waltham	April 21, 1937	Conviction

Using Decomposed Eggs in the Manufacture of Food Products

Boston Baking Company	Roxbury	Roxbury	Feb. 16, 1937	Conviction
Nagle, Sadie	Roxbury	Roxbury	Feb. 26, 1937	Conviction

False and Misleading Advertising

Maple Syrup
(False Advertising of Maple Syrup)

Janopolis, Sam	Provincetown	Provincetown	June 14, 1937	Conviction

[1] Corporation was defaulted; penalty of $50.00 imposed on a writ by the court.
[2] Guilty, fined $50.00 in lower court; in Salem Superior Court — placed on file.
[3] Appealed — Defendant died before case came up in Superior Court.
Defaulted — warrant issued and still outstanding.

For Violation of Frozen Dessert Law or Regulations Made Thereunder

Coppa, Aniello	Providence, R. I.	Taunton	May 21, 1937	Conviction
Eastland Farms, Inc.	Malden	Malden	Sept. 16, 1937	Dismissed
Kohr Brothers, Inc.	Wollaston	Quincy	July 29, 1937	Conviction
Regis Products Company, Inc.	Cambridge	Cambridge	Mar. 17, 1937	—[1]
Whitman Dairy, Inc.	Pittsfield	Pittsfield	June 30, 1937	Conviction

For Violation of Law and Regulations Relative to the Manufacture and Bottling of Carbonated Non-Alcoholic Beverages, Soda Water, Mineral and Spring Water

Operating without Permit				
Francus, Frank	Gill	Greenfield	Mar. 5, 1937	Conviction
Operating a Soft Drink Plant under Insanitary Conditions				
Argeros, John	Peabody	Peabody	June 18, 1937	Conviction
Borowicz, John	New Bedford	New Bedford	April 28, 1937	Conviction
Grigalmas, Louis	Athol	Athol	July 6, 1937	Conviction
Joffee, Abraham	Pittsfield	Pittsfield	July 7, 1937	Conviction
Kanter, Samuel	Beverly	Salem	June 3, 1937	—[2]
Kuczarski, Frank	Easthampton	Northampton	Feb. 4, 1937	Conviction
Millman, Simon	Roxbury	Roxbury	Nov. 19, 1937	Conviction
Perlstein, Hyman	Shirley	Ayer	Feb. 10, 1937	Conviction
Perlstein, Lewis	Shirley	Ayer	Feb. 10, 1937	Dismissed
Rapulus, Stanislaus	Ludlow	Springfield	Feb. 11, 1937	Conviction
Starzec, Alexander	Webster	Webster	Dec. 15, 1936	Conviction
Tip Top Beverage, Inc.	Springfield	Springfield	May 6, 1937	Conviction
Washington Beverage Company	Worcester	Worcester	July 16, 1937	Conviction
Using Wash Water Deficient in Caustic Alkali				
Bechard, Louis	Lowell	Lowell	Mar. 26, 1937	Conviction
Borowicz, John	New Bedford	New Bedford	April 28, 1937	Conviction

For Violation of Sanitary Food Law

Bresnick, Abraham	Revere	Chelsea	Sept. 16, 1937	Dismissed
Bresnick, Abraham	Revere	Chelsea	Sept. 16, 1937	Dismissed
Connolly, Patrick	Boston	Boston	Oct. 26, 1937	Conviction
Dow, George Russell	Salisbury	Amesbury	July 23, 1937	Conviction
Waldorf System, Inc.	Quincy	Quincy	Oct. 22, 1937	Dismissed

For Violation of Bakery Laws

Bergmann, Herman	Easthampton	Northampton	Jan. 28, 1937	Conviction[3]
Bergmann, Jacob	Easthampton	Northampton	Jan. 28, 1937	Conviction[3]
Betty Alden, Inc.	Boston	Boston	Feb. 18, 1937	Conviction
Boston Baking Company	Roxbury	Roxbury	Feb. 16, 1937	Conviction
Boston Baking Company	Roxbury	Roxbury	June 25, 1937	Conviction
Eicoff, Morris	Roxbury	Roxbury	Feb. 16, 1937	Conviction
Kessler, William J.	Easthampton	Northampton	Jan. 28, 1937	Conviction[3]
Litridis, Harry S.	Pittsfield	Pittsfield	July 20, 1937	Conviction
Massell, Joseph	Roxbury	Roxbury	Feb. 26, 1937	Conviction
Nagle, Sadie	Roxbury	Roxbury	Feb. 26, 1937	Conviction
Nagle, Sadie	Roxbury	Roxbury	May 28, 1937	Conviction
Ostrov, Max	Boston	Boston	Feb. 11, 1937	Conviction
Rothblatt, Samuel	Salem	Salem	April 27, 1937	Conviction[4]
Rothblatt, Samuel	Salem	Salem	April 27 1937,	Conviction[4]
Silver, Max	Springfield	Springfield	Feb. 26, 1937	Conviction
Ward Baking Company	Cambridge	Cambridge	Mar. 2, 1937	—[5]
Weisbaum, Jacob	Boston	Boston	Feb. 18, 1937	Conviction

For Violation of Laws Pertaining to Sale of Shellfish

Baptiste, Joseph	Chicopee	Chicopee	Oct. 14, 1937	—[6]
De Orio, John	Revere	Holyoke	Oct. 15, 1937	Conviction
Gorton's Fish Market	Fall River	Fall River	June 16, 1937	Discharged
Page, Howard C.	Seabrook, N. H.	Amesbury	April 24, 1937	Conviction
Reed, Royal	Revere	South Boston	Feb. 15, 1937	Conviction
Wells, George R.	Revere	Boston	Mar. 4, 1937	Discharged

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[1] Guilty, $20 fine in lower court; Cambridge Superior — Nol Prossed.
[2] Guilty, $50 fine in lower court; Salem Superior — Not Guilty.
[3] Guilty, fined $25.00; suspended for 1 year.
[4] In lower court, Guilty, $25.00 fine; in Lawrence Superior Court, first case filed — second case Nolo Contendere, fined $25.00.
[5] Nolo Contendere — Dismissed on payment of $20.00 cost.
[6] Placed on probation for one year.

For Sale of Adulterated or Misbranded Drugs Not Conforming to the Requirements of the U. S. Pharmacopoeia

ARGYROL

Adamo Drug Company, Inc.	Boston	Boston	Mar. 29, 1937	Conviction
Liberman, Julius	Boston	Roxbury	Dec. 18, 1936	Conviction
Liggett Drug Company, Inc.	Worcester	Worcester	April 2, 1937	Conviction
Liggett Drug Company, Inc.	Boston	Boston	April 23, 1937	Conviction

SWEET SPIRIT OF NITRE

Old Elm Drug, Inc.	Roxbury	Roxbury	April 14, 1937	Conviction
Oppenheim, Joseph	Boston	Boston	April 1, 1937	Conviction

For Violation of the Laws Relative to Cold Storage

SELLING COLD STORAGE EGGS WITHOUT MARKING THE CONTAINER

Delmolino, Ernest	Springfield	Springfield	Feb. 5, 1937	Conviction

For Violation of the Laws Relative to Slaughtering

Bellerose, Emil	Southbridge	Southbridge	May 26, 1937	Conviction
Frome, Bernard	Dudley	Southbridge	May 26, 1937	Discharged
Power, Joseph P.	Southbridge	Southbridge	May 26, 1937	Conviction

For Violation of Law Pertaining to Bedding and Upholstered Furniture

Bay State Upholstering Company, Inc.	Hyde Park	West Roxbury	April 30, 1937	Conviction
Berkshire Bedding Company	Pittsfield	Pittsfield	July 20, 1937	Conviction
Chester Furniture Company	Malden	Malden	Oct. 15, 1937	Conviction
Douglas, Joseph	Lynn	Lynn	Feb. 12, 1937	Conviction
DuBois, Jules L.	Braintree	Harwich	Jan. 15, 1937	Conviction
Ehrlich, Inc., Charles J.	Brockton	Brockton	May 3, 1937	Conviction
General Mattress Company	Fall River	Fall River	Feb. 26, 1937	Conviction
General Mattress Company	Fall River	Fall River	Oct. 21, 1937	Conviction
Goldberg, William	Roxbury	Roxbury	Nov. 26, 1937	Conviction
Kaplan, Max	New Bedford	New Bedford	Jan. 19, 1937	Conviction
Leonard Furniture Company	Boston	Boston	Nov. 23, 1937	Conviction
London, Benjamin	Malden	Malden	May 6, 1937	Discharged
London, Benjamin	Malden	Malden	Sept. 24, 1937	Conviction
Marmarale, Anthony	East Boston	East Boston	Aug. 19, 1937	Conviction[1]
Milstone, Edward	Lawrence	Lawrence	July 12, 1937	Conviction
Moretsky, Abraham	Chelsea	Chelsea	Dec. 18, 1936	Conviction
National Mattress Company	Boston	Roxbury	Dec. 15, 1936	Conviction
Pioneer Chair Company, Inc.	Boston	Boston	Oct. 8, 1937	Conviction
Pisiello, George	East Boston	East Boston	Aug. 19, 1937	Conviction[1]
Pollack, Jacob	Boston	Boston	Oct. 14, 1937	Conviction
Regal Bedding Company	Fall River	Fall River	Oct. 29, 1937	Conviction
Rudolph Furniture Company, Inc.	Taunton	Taunton	Jan. 27, 1937	Discharged
Springfield Upholstery Works, Inc.	Springfield	North Adams	Feb. 2, 1937	Conviction
Suffolk Upholstering & Mattress Company	Lynn	Lynn	May 12, 1937	Conviction
Sunset Bedding Company, Inc.	Boston	Boston	Dec. 16, 1936	Conviction
Sunset Bedding Company, Inc.	Boston	Boston	Aug. 3, 1937	Conviction
Tulchin, Harry	Fall River	Fall River	Oct. 21, 1937	Conviction

Obstruction of an Inspector

Bialsky, Harry	Dorchester	Dorchester	Mar. 26, 1937	Conviction

[1] Guilty, $50 fine — suspended; placed on probation for six months.

TABLE 2.—*Summary of Milk Statistics*

Number of samples above standard	6,043
Number of samples below standard	941
Total samples	6,984
Number having more than 15% solids	21
Number having between 14% and 15% solids	210
Number having between 13% and 14% solids	1,599
Number having between 12% and 13% solids	4,213
Number having between 11% and 12% solids	875
Number having between 10% and 11% solids	59
Number having between 9% and 10% solids	7
Number of samples showing removal of cream in part	36
Number of samples containing added water	24
Number of samples of skimmed milk sold as such	1

TABLE 3.—*Average Composition of Milk Samples*

	Total Samples				Samples Not Declared Adulterated			
			Average				Average	
	Number of Samples	Total Solids	Fat	Solids not Fat	Number of Samples	Total Solids	Fat	Solids not Fat
		%	%	%		%	%	%
December	281	12.82	4.00	8.82	280	12.83	4.00	8.83
January	311	12.81	4.01	8.80	309	12.82	4.02	8.80
February	402	12.36	3.88	8.48	400	12.36	3.88	8.48
March	934	12.71	3.93	8.78	928	12.72	3.94	8.78
April	846	12.68	3.95	8.73	837	12.70	3.96	8.74
May	710	12.62	3.95	8.67	706	12.63	3.96	8.67
June	902	12.54	3.88	8.66	885	12.56	3.90	8.66
July	726	12.35	3.80	8.55	718	12.36	3.81	8.55
August	724	12.56	3.98	8.58	723	12.56	3.98	8.58
September	435	12.88	4.16	8.72	431	12.90	4.17	8.73
October	287	12.98	4.35	8.63	286	12.99	4.35	8.63
November	426	12.71	4.01	8.70	421	12.72	4.01	8.71
Average for year	6,984	12.63	3.96	8.67	6,924	12.65	3.97	8.68

TABLE 4.—*Summary of Analyses of Food Samples*

Character of Sample	Legal	Illegal	Total
Butter	44	12	56
Canned foods	4	–	4
Cereals	2	1	3
Cheese	13	–	13
Cider	1	–	1
Confectionery	4	2	6
Cream	38	2	40
Dried fruits	1	1	2
Eggs	84	10	94
Flavoring extracts	11	–	11
Frozen desserts	556	–	556
Fruit	13	–	13
Honey	1	–	1
Infant foods	1	1	2
Jellies	1	–	1
Maple syrup	3	3	6
Maple sugar	3	–	3
Meat products:			
Bacon	1	–	1
Fowl	–	1	1
Hamburg steak	431	89	520
Lamb patties	–	2	2
Liver	1	–	1
Mock chicken legs	–	1	1
Pressed ham	–	1	1
Savory duck	1	–	1
Sausages	391	57	448
Scrapple	2	–	2
Stew beef	–	3	3
Veal chop	1	–	1
Olive oil	102	7	109
Pastry	1	–	1
Split peas	–	1	1
Pickles and relishes	60	3	63
Pop corn	1	–	1
Poppy seed	2	–	2
Proprietary foods	1	–	1
Soft drinks	55	24	79
Tomato juice	20	–	20
Vegetable gum	1	–	1
Vinegar	15	1	16
Totals	1,866	222	2,088

TABLE 5.—*Summary of Bacteriological Examinations—Milk*

CERTIFIED MILK			
Total samples			74
Lowest count	150		
Highest count	13,000		
Samples with count below 10,000	70		
PASTEURIZED CERTIFIED MILK			
Total Samples			63
Lowest count	less than 10		
Highest count	4,000		
Samples with count below 500		56	
GRADE A PASTEURIZED MILK			
Total Samples			370
Lowest count	less than 100		
Highest count	490,000		
Geometric Mean of Counts			
December, January, February	3,900		
March, April, May	4,200		
June, July, August	7,600		
September, October, November	5,800		
Samples with count below 10,000		258	
GRADE A RAW MILK			
Total Samples			88
Lowest count	1,000		
Highest count	128,000		
Samples with count below 100,000		73	
RAW MILK TO BE PASTEURIZED AS GRADE A MILK			
Total Samples			43
Lowest count	1,000		
Highest count	128,000		
Samples with count below 100,000		36	
PASTEURIZED MILK			
Total Samples			2,249
Lowest count	200		
Highest count	2,600,000		
Geometric Mean of Counts			
December, January, February	13,580		
March, April, May	20,000		
June, July, August	28,900		
September, October, November	15,900		
Samples with counts below 25,000		1,356	
Samples with counts below 40,000		1,643	
RAW MILK SOLD AS SUCH			
Total Samples			581
Lowest count	2,000		
Highest count	16,000,000		
Geometric Mean of Counts			
December, January, February	21,400		
March, April, May	34,000		
June, July, August	53,000		
September, October, November	62,700		
Samples with counts below 400,000		494	
RAW MILK TO BE PASTEURIZED			
Total Samples			4,588
Lowest count	less than 1,000		
Highest count	18,000,000		
Geometric Mean of Counts			
December, January, February	77,804		
March, April, May	38,900		
June, July, August	104,000		
September, October, November	89,400		
Samples with counts below 100,000		2,571	
Samples with counts below 250,000		3,353	
Samples with counts below 400,000		3,737	
SPECIAL PASTEURIZED MILK			
Total Samples			28
Lowest count	500		
Highest count	49,000		
Samples with counts below 5,000		19	
SPECIAL MILK RAW			
Total Samples			6
Lowest count	7,600		
Highest count	19,000		
Samples with counts below 50,000		6	
Complying with requirements		6,392	
Not complying with requirements		1,698	
Total Samples			8,090

TABLE 6.—*Summary of Bacteriological Examinations*

	Satisfactory	High Count	Total
Canned lobster and crab meat	4	–	4
Fresh lobster and crab meat	2	27	29
Canned salmon	2	–	2
Sardines	1	–	1
Dog food	2	–	2
Chocolate cookies	3	–	3
Chocolate drinks	2	2	4
Orangeade	1	–	1
Egg powder	1	–	1
Meat products	15	46	61
Mattress filling	46	21	67
Empty bottles	4	9	13
Totals	83	105	188
Raw cream	2	2	4
Pasteurized cream	45	21	66
Ice cream	537	68	605
Sherbet	12	–	12
Totals	596	89	687

TABLE 7.—*Summary of Analyses of Drug Samples*

CHARACTER OF SAMPLE	Legal	Illegal	Total
Rubbing alcohol	1	–	1
Argyrol solution	78	9	87
Silver proteinate	2	–	2
Aromatic spirit of ammonia	2	–	2
Aspirin tablets	2	–	2
Camphorated oil	12	–	12
Compound licorice powder	1	–	1
Cough syrup	1	–	1
Fluid extract of ergot	9	–	9
Fowler's solution	–	1	1
Lime water	17	1	18
Olive oil	1	1	2
Pine tar	–	1	1
Proprietary drugs	2	–	2
Solution of hydrogen dioxide	–	1	1
Spirit of camphor	13	–	13
Spirit of nitrous ether	82	13	95
Spirit of peppermint	1	–	1
Spirit of turpentine	1	–	1
Tincture of iodine	10	6	16
Totals	235	33	268

TABLE 8.—*Slaughtering Report from December 1, 1936 through November 30, 1937*

Total Number of Carcasses Inspected 167,891

Cattle	27,241	Hogs	55,487
Calves	79,245	Sheep	5,918

Total Number of Carcasses Condemned 1,888

Cattle	140	Hogs	461
Calves	1,284	Sheep	3

REASONS FOR CONDEMNATION	Cattle	Calves	Hogs	Sheep	Totals
Immaturity	–	1,037	–	–	1,037
Cholera	–	–	305	–	305
Died otherwise than by slaughter	21	180	6	–	207
Pneumonia	13	4	46	–	63
Tuberculosis	29	7	20	3	59
Emaciation	17	4	33	–	54
Septicemia	17	4	15	–	36
Injured	9	17	3	–	29
Abscesses	7	1	12	–	20
Enteritis	1	8	9	–	18
Fetus	–	15	–	–	15
Nephritis	2	5	1	–	8
Peritonitis	4	–	1	–	5
Cirrhosis	1	1	2	–	4
Septic metritis	4	–	–	–	4
Tumor	3	–	–	–	3
Fever	3	–	–	–	3
Mange	–	–	3	–	3
Paralysis	2	–	–	–	2
Slaughtered illegally	–	1	1	–	2
Mastitis	2	–	–	–	2
Adhesions	1	–	1	–	2
Cancer	1	–	–	–	1
Acute indigestion	1	–	–	–	1
Pleurisy	–	–	1	–	1
Icterus	–	–	1	–	1
Pericarditis	1	–	–	–	1
Diseased organs	1	–	–	–	1
Rupture	–	–	1	–	1
Totals	140	1,284	461	3	1,888

TABLE 9. — *Articles Other than Fish Placed in Cold Storage from December 1, 1936, to December 1, 1937*

	Butter (lbs.)	Eggs (Dozens)	Broken-out Eggs (lbs.)	Broilers (lbs.)	Roasters (lbs.)	Fowls (lbs.)	Turkeys (lbs.)	Ducks (lbs.)	Miscellaneous Poultry (lbs.)	Beef (lbs.)	Pork (lbs.)	Lamb and Mutton (lbs.)	Miscellaneous Meats (lbs.)
December	390,483	203,460	693,561	314,891	1,302,599	400,091	2,255,998	18,602	586,612	1,171,131	5,429,834	483,027	1,788,284
January	519,910	544,950	554,930	135,962	617,882	362,167	1,299,281	24,660	231,194	970,044	2,487,531	129,398	1,081,782
February	328,660	792,030	595,080	243,354	401,917	283,065	932,481	15,239	189,203	488,565	724,879	81,553	602,779
March	317,331	957,570	1,139,956	194,272	264,839	301,666	1,079,924	27,973	289,228	963,064	1,321,384	97,765	615,542
April	206,065	2,257,860	1,224,397	232,191	404,699	109,631	696,787	52,502	197,445	775,945	1,717,562	128,572	561,747
May	853,314	2,409,060	2,342,352	126,517	303,486	222,083	1,005,423	178,642	453,630	992,434	1,341,707	108,376	660,759
June	4,320,769	747,450	2,147,800	152,739	288,463	301,150	928,738	343,734	392,238	673,694	1,392,807	172,431	803,019
July	3,054,703	317,070	1,314,873	207,333	202,557	325,183	590,794	306,127	157,202	735,668	1,169,678	119,271	792,111
August	1,080,626	424,410	1,067,935	126,556	153,889	238,337	637,575	208,033	133,053	851,688	654,637	74,026	839,121
September	660,374	215,850	682,099	212,105	280,180	235,610	349,906	105,365	153,067	936,377	856,585	124,838	751,388
October	499,816	244,320	406,970	204,226	511,973	230,722	636,728	73,391	111,081	952,989	876,247	131,677	749,288
November	452,499	327,840	500,694	175,387	573,710	394,540	1,858,871	41,582	402,230	787,881	1,043,167	25,723	1,017,213

TABLE 10. — *Articles Other than Fish on Hand in Cold Storage on the First Day of the Month, from January 1, 1937, through December 1, 1937*

	Butter (lbs.)	Eggs (Dozens)	Broken-out Eggs (lbs.)	Broilers (lbs.)	Roasters (lbs.)	Fowls (lbs.)	Turkeys (lbs.)	Ducks (lbs.)	Miscellaneous Poultry (lbs.)	Beef (lbs.)	Pork (lbs.)	Lamb and Mutton (lbs.)	Miscellaneous Meats (lbs.)
January	1,911,992	414,210	1,581,936	2,214,227	2,715,247	1,419,205	2,792,348	441,219	1,316,405	3,420,689	6,545,931	718,571	2,401,055
February	1,537,344	657,240	1,278,865	1,965,479	2,837,393	1,353,929	3,590,558	307,270	1,165,554	3,331,902	8,599,013	698,877	2,595,902
March	706,262	1,339,710	1,029,011	1,726,971	2,588,585	1,206,318	3,556,781	157,352	1,141,307	2,766,282	8,473,349	626,400	2,233,502
April	303,239	2,153,280	1,231,982	1,338,720	2,106,268	808,919	3,194,910	50,700	855,858	2,678,943	8,154,651	408,968	1,838,987
May	209,520	4,296,180	1,543,904	975,056	1,614,445	400,845	2,658,302	47,612	577,143	2,365,652	8,018,020	231,041	1,666,271
June	854,624	4,855,050	2,916,078	743,286	1,170,722	239,452	2,597,996	220,894	654,430	2,370,786	5,693,370	191,699	1,338,892
July	4,773,855	5,336,070	3,985,362	580,100	901,888	304,649	2,501,973	556,800	612,212	1,923,808	3,633,726	229,804	1,178,522
August	7,196,268	5,149,350	4,276,956	468,459	649,455	238,655	2,115,524	825,979	515,001	1,623,957	2,327,827	200,465	1,249,707
September	7,207,398	4,762,200	4,300,313	380,557	350,270	148,019	1,319,721	988,032	261,710	1,346,313	1,050,561	160,490	1,117,875
October	6,316,155	3,561,060	4,057,800	457,410	385,247	208,926	519,243	1,016,314	306,599	1,222,685	588,836	118,981	987,579
November	4,362,285	2,142,630	3,438,006	412,730	786,974	285,143	411,576	980,481	221,536	957,565	760,652	130,361	672,646
December	2,589,801	1,052,850	3,016,755	480,063	1,244,182	533,927	1,693,195	784,545	512,365	915,408	1,180,007	85,436	789,451

TABLE 11. — *Fish Placed in Cold Storage from December 15, 1936, to December 15, 1937*

	Bluefish (lbs.)	Butterfish (lbs.)	Catfish (lbs.)	Ciscoes (lbs.)	Cod, Hake, Pollock and Haddock (lbs.)	Flounders (lbs.)	Haddock Fillets (lbs.)	Halibut (lbs.)	Herring (lbs.)	Mackerel (lbs.)	Fall and Silver Salmon (lbs.)	Salmon all Others (lbs.)	Shad (lbs.)	Smelts, Eulachon, etc. (lbs.)	Squid (lbs.)	Whitefish (lbs.)	Whiting (lbs.)	Miscellaneous Frozen Fish (lbs.)
January	1,740	4,841	2,230	350	2,609,233	55,546	1,522,847	253,908	23,287	23,611	110,420	32,764	140	141,395	29,885	3,600	117,136	1,890,233
February	3,921	2,211	14,516	300	726,792	66,266	1,323,587	116,318	78,690	36,739	33,316	14,392	–	151,959	–	12,906	505,690	859,640
March	7,123	318	16,120	–	380,000	35,904	1,777,155	113,697	20,500	53,268	48,700	17,495	142	276,108	–	2,545	10,610	623,448
April	1,774	2,643	62,964	–	637,187	38,800	3,213,445	45,306	34,080	47,874	13,876	2,500	394	24,310	4,080	–	471,737	768,015
May	124	3,846	65,308	–	1,271,692	93,155	1,671,452	13,498	60,272	49,342	11,205	1,006	6,264	1,760	471,344	592	123,655	787,398
June	653	78,882	15,503	–	2,370,943	211,395	2,673,725	82,033	6,925	795,934	642	1,250	30,160	985	1,727,067	23,930	4,668,245	2,338,222
July	1,482	68,178	3,275	3,575	2,992,603	38,835	2,734,583	70,782	45,287	532,194	6,464	15,892	6,465	930	98,447	18,420	6,160,564	1,831,960
August	12,198	133,752	8,268	3,645	2,416,625	37,585	3,296,268	25,951	114,009	965,300	2,305	1,810	–	275	55,599	23,535	1,174,251	2,231,344
September	5,153	31,169	1,800	830	1,605,881	46,970	2,794,715	29,239	40,029	290,664	6,192	2,639	1,736	410	72,853	9,309	852,508	1,782,570
October	2,252	26,289	565	300	1,936,981	72,485	3,365,085	116,118	826,898	484,879	37,897	39,000	–	2,165	69,086	9,572	2,599,758	1,188,268
November	6,803	1,591	515	–	3,245,150	145,845	1,233,744	193,444	604,212	600,785	42,341	7,006	358	7,685	84,292	5,793	1,414,159	2,127,141
December	8,924	845	667	–	4,312,597	71,628	1,030,099	183,900	31,886	756,916	48,193	32,388	115	26,502	11,446	23,910	260,799	3,097,926

TABLE 12. — *Fish on Hand in Cold Storage on the Fifteenth Day of the Month, from January 15, 1937, through December 15, 1937*

	Bluefish (lbs.)	Butterfish (lbs.)	Catfish (lbs.)	Ciscoes (lbs.)	Cod, Hake, Pollock and Haddock (lbs.)	Flounders (lbs.)	Haddock Fillets (lbs.)	Halibut (lbs.)	Herring (lbs.)	Mackerel (lbs.)	Fall and Silver Salmon (lbs.)	Salmon all Others (lbs.)	Shad (lbs.)	Smelts, Eulachon, etc. (lbs.)	Squid (lbs.)	Whitefish (lbs.)	Whiting (lbs.)	Miscellaneous Frozen Fish (lbs.)
January	29,349	126,866	33,982	14,758	9,815,732	101,330	2,144,823	345,118	766,245	3,334,188	173,465	56,225	146,404	258,405	432,375	15,708	10,840,702	7,583,934
February	22,149	64,412	38,987	9,663	8,359,637	107,717	2,019,377	190,691	494,618	2,125,551	123,550	51,055	127,382	345,579	282,986	25,604	9,541,638	5,956,466
March	16,339	10,422	47,264	6,496	6,658,037	78,297	1,814,800	114,851	145,177	1,144,362	91,694	48,881	87,374	522,779	118,855	14,389	8,019,025	4,554,890
April	8,481	6,700	100,533	686	5,483,890	39,850	3,195,320	90,238	25,442	420,180	18,306	17,772	56,894	424,813	36,920	1,142	6,705,714	3,052,397
May	5,838	7,678	145,527	–	4,492,237	88,668	2,636,058	89,201	65,026	146,859	5,056	6,836	42,037	375,833	472,705	657	5,172,801	2,543,788
June	2,947	83,342	149,349	–	3,112,561	257,131	3,234,656	149,417	56,174	797,324	3,326	6,239	65,657	356,012	2,122,855	3,080	5,143,624	3,397,288
July	2,629	146,450	124,790	3,365	3,819,387	250,373	4,632,924	202,557	90,794	1,103,212	3,594	20,450	46,523	343,005	1,986,482	19,728	8,564,331	4,009,416
August	11,216	267,337	88,285	5,855	4,618,005	232,965	5,366,969	215,434	178,727	1,692,997	4,578	18,447	21,015	335,925	1,944,250	37,975	7,675,066	4,936,653
September	6,201	286,696	46,863	5,755	4,250,511	205,301	4,942,506	196,376	115,049	1,394,916	7,505	17,848	22,139	321,179	1,820,946	40,223	5,622,066	4,844,274
October	5,458	292,606	21,663	5,865	3,728,450	213,058	5,836,828	257,428	710,961	1,602,497	36,343	47,930	19,820	258,002	1,546,684	41,932	5,712,629	3,495,078
November	8,714	262,153	15,360	5,565	4,546,115	308,557	4,705,957	320,482	1,004,343	1,873,640	70,790	49,876	18,903	200,581	1,428,434	33,336	5,091,014	3,808,287
December	15,140	190,086	15,742	5,565	6,761,397	263,323	4,008,318	306,175	733,340	2,393,073	81,010	67,224	17,720	138,383	1,232,755	51,504	3,693,281	5,287,548

Summary of Tables 13, 14, 15

Requests for extension of time granted		333
Eggs	14	
Poultry	79	
Meat and Meat Products	9	
Game	1	
Fish	230	
Requests for extension of time not granted		23
Poultry	12	
Fish	11	
Articles ordered removed from storage (no requests made)		85
Eggs	21	
Poultry	7	
Meat and Meat Products	5	
Fish	52	

TABLE 13.—*Requests for Extension of Time Granted on Goods in Cold Storage, from December 1, 1936 to December 1, 1937*

(Reason for such extension being that goods were in proper condition for further storage.)

ARTICLE	Weight (Pounds)	Placed in Storage	Extension Granted to	Name
Mixed Eggs	960	June 30, 1936	*Nov. 30, 1937	Armour & Co.
Mixed Eggs	15,000	Mar. 1, 1936	May 1, 1937	Gersh Co , Bernard
Mixed Eggs	900	May 12, 1936	July 1, 1937	Stone Co., C. H.
Mixed Eggs	1,500	July 14, 1936	Sept. 1, 1937	Stone Co., C. H.
Mixed Eggs	2,325	July 14, 1936	Sept. 1, 9937	Stone Co., C. H.
Sugaryolks	4,800	Mar. 23, 1936	*Sept. 30, 1937	Stone Co., C. H.
Sugaryolks	1,530	June 6, 1936	*Nov. 1, 1937	Stone Co., C. H.
Sugaryolks	6,000	Mar. 30, 1936	April 30, 1937	Wilson & Co.
Egg Whites	1,680	June 5, 1936	Aug. 1, 1937	Stone Co., C. H.
Egg Whites	300	May 8, 1936	June 8, 1937	Wilson & Co.
Egg Whites	23,520	May 19, 1936	July 19, 1937	Wilson & Co.
Whole Eggs	30,000	Mar. 20, 1936	July 1, 1937	Armour & Co.
Whole Eggs	30,000	April 7, 1936	July 1, 1937	Armour & Co.
Whole Eggs	9,000	April 30, 1936	July 30, 1937	Borden Co.
Broilers	549	June 24, 1936	Oct. 20, 1937	Berman & Co., Inc.
Broilers	701	June 24, 1936	Oct. 20, 1937	Berman & Co., Inc.
Broilers	785	June 25, 1936	Oct. 25, 1937	Berman & Co., Inc.
Broilers	461	June 25, 1936	Oct. 25, 1937	Berman & Co., Inc.
Broilers	571	July 11, 1936	Oct. 13, 1937	Berman & Co., Inc.
Broilers	3,863	July 17, 1936	Oct. 18, 1937	Berman & Co., Inc.
Broilers	798	July 17, 1936	Oct. 18, 1937	Berman & Co., Inc.
Broilers	424	July 20, 1936	Oct. 20, 1937	Berman & Co., Inc.
Broilers	212	July 24, 1936	Oct. 24, 1937	Berman & Co., Inc.
Broilers	698	July 24, 1936	Oct. 24, 1937	Berman & Co., Inc.
Broilers	1,320	July 24, 1936	Oct. 24, 1937	Berman & Co., Inc.
Broilers	269	July 24, 1936	Oct. 24, 1937	Berman & Co., Inc.
Broilers	338	July 25, 1936	Oct. 27, 1937	Berman & Co., Inc.
Broilers	566	July 25, 1936	Oct. 27, 1937	Berman & Co., Inc.
Broilers	2,292	July 25, 1936	Oct. 27, 1937	Berman & Co., Inc.
Broilers	437	July 27, 1936	Oct. 27, 1937	Berman & Co., Inc.
Broilers	366	Aug. 3, 1936	Nov. 1, 1937	Berman & Co., Inc.
Broilers	1,520	Aug. 6, 1936	Nov. 1, 1937	Berman & Co., Inc.
Broilers	384	Aug. 8, 1936	Nov. 9, 1937	Berman & Co., Inc.
Broilers	315	Aug. 8, 1936	Nov. 9, 1937	Berman & Co., Inc.
Broilers	270	Aug. 10, 1936	Nov. 9, 1937	Berman & Co., Inc.
Broilers	741	Aug. 26, 1936	Nov. 29, 1937	Berman & Co., Inc.
Broilers	922	Sept. 18, 1936	*Jan. 29, 1938	First National Stores, Inc.
Broilers	4,500	Sept. 25, 1936	*Jan. 29, 1938	First National Stores, Inc.
Broilers	1,766	Sept. 28, 1936	*Jan. 29, 1938	First National Stores, Inc.
Broilers	1,055	Sept. 28, 1936	Nov. 30, 1937	First National Stores, Inc.
Broilers	98	Sept. 28, 1936	*Jan. 29, 1938	First National Stores, Inc.
Broilers	102	Sept. 28, 1936	*Jan. 29, 1938	First National Stores, Inc.
Broilers	1,820	Oct. 1, 1936	Nov. 30, 1937	First National Stores, Inc.
Broilers	8,347	Oct. 3, 1936	*Feb. 2, 1938	First National Stores, Inc.
Broilers	3,450	Oct. 3, 1936	*Feb. 2, 1938	First National Stores. Inc.
Broilers	718	Oct. 5, 1936	*Feb. 2, 1938	First National Stores, Inc.
Broilers	131	Oct. 6, 1936	*Feb. 2, 1938	First National Stores, Inc.
Broilers	2,956	Oct. 15, 1936	*Feb. 12, 1938	First National Stores, Inc.
Broilers	134	Oct. 15, 1936	*Feb. 12, 1938	First National Stores, Inc.
Broilers	78	Oct. 31, 1936	*Feb. 12, 1938	First National Stores, Inc.
Broilers	10,585	Oct. 16, 1936	*Mar. 16, 1938	First National Stores, Inc.
Chickens	555	July 18, 1936	Oct. 20, 1937	Berman & Co., Inc.
Chickens	590	Aug. 6, 1936	Nov. 1, 1937	Berman & Co., Inc.
Chickens	325	Aug. 19, 1936	Nov. 29, 1937	Berman & Co., Inc.
Chickens	413	Aug. 25, 1936	Nov. 29, 1937	Berman & Co., Inc.
Chickens	297	Aug. 29, 1936	Nov. 29, 1937	Berman & Co., Inc.
Chickens, Dressed	6,577	Nov. 9, 1936	*Mar. 11, 1938	First National Stores, Inc.

*The extension granted on this lot was amended before the expiration of the time to which extended. The length of time given includes the total amended period, and the weights given are the initial weights upon which extensions were asked.

TABLE 13.—*Requests for Extension of Time Granted on Goods in Cold Storage, from December 1, 1936 to December 1, 1937*—Continued

Article	Weight (Pounds)	Placed in Storage	Extension Granted to	Name
Chickens, Dressed	1,406	Nov. 9, 1936	*Mar. 11, 1938	First National Stores, Inc.
Cocks	888	June 20, 1936	July 20, 1937	Berman & Co., Inc.
Cocks	436	June 30, 1936	July 30, 1937	Berman & Co., Inc.
Cocks	1,681	June 30, 1936	July 30, 1937	Berman & Co., Inc.
Cocks and Fowl	793	Aug. 8, 1936	Nov. 9, 1937	Berman & Co., Inc.
Fowl	1,513	June 15, 1936	Oct. 15, 1937	Berman & Co., Inc
Fowl	942	June 15, 1936	Oct. 15, 1937	Berman & Co., Inc.
Fowl	3,099	June 20, 1936	Oct. 20, 1937	Berman & Co., Inc.
Fowl	1,501	June 26, 1936	Oct. 25, 1937	Berman & Co., Inc.
Fowl	1,557	July 9, 1936	Oct. 13, 1937	Berman & Co., Inc.
Fowl	3,459	July 9, 1936	Oct. 13, 1937	Berman & Co., Inc.
Fowl	860	July 9, 1936	Oct. 13, 1937	Berman & Co., Inc.
Fowl	1,709	July 9, 1936	Oct. 13, 1937	Berman & Co., Inc.
Fowl	2,255	July 13, 1936	Oct. 13, 1937	Berman & Co., Inc.
Fowl	760	July 13, 1936	Oct. 13, 1937	Berman & Co., Inc.
Fowl	571	July 18, 1936	Oct. 18, 1937	Berman & Co., Inc.
Fowl	1,317	July 18, 1936	Oct. 18, 1937	Berman & Co., Inc.
Fowl	1,156	July 20, 1936	Oct. 20, 1937	Berman & Co., Inc.
Fowl	1,257	July 27, 1936	Oct. 27, 1937	Berman & Co., Inc.
Fowl	1,608	Aug. 3, 1936	Nov. 1, 1937	Berman & Co., Inc.
Fowl	1,260	Aug. 3, 1936	Nov. 1, 1937	Berman & Co., Inc.
Fowl	814	Aug. 3, 1936	Nov. 1, 1937	Berman & Co., Inc.
Fowl	950	Aug. 6, 1936	Nov. 1, 1937	Berman & Co., Inc.
Fowl	2,907	Aug. 10, 1936	Nov. 9, 1937	Berman & Co., Inc.
Fowl	1,184	Oct. 3, 1936	Feb. 3, 1938	Berman & Co., Inc.
Fryers and Broilers	4,459	Sept. 26, 1936	*Jan. 25, 1938	First National Stores, Inc.
Roasters	2,162	Feb. 17, 1936	May 17, 1937	Berman & Co., Inc.
Roasters	3,127	June 3, 1936	Sept. 15. 1937	Berman & Co., Inc.
Turkeys	3,043	Nov. 27, 1935	Mar. 1, 1937	Bartlett, Varney Co.
Turkeys	3,325	Nov. 29, 1935	Mar. 1, 1937	Bartlett, Varney Co.
Turkeys	256	Nov. 30, 1935	Mar. 1, 1937	Bartlett, Varney Co.
Turkeys	2,975	Nov. 1, 1936	Mar. 1, 1938	Frosted Foods Sales Co.
Turkeys	1,729	Nov. 2, 1936	Mar. 1, 1938	Frosted Foods Sales Co.
Turkeys	3,422	Nov. 4, 1936	Mar. 1, 1938	Frosted Foods Sales Co.
Turkeys	2,353	Nov. 4, 1936	Mar. 1, 1938	Frosted Foods Sales Co.
Turkeys	5,481	Nov. 5, 1936	Mar. 1, 1938	Frosted Foods Sales Co.
Beef Livers	3,000	Oct. 13, 1936	Dec. 13, 1937	United Markets, Inc.
Beef Loins	3,180	Aug. 4, 1936	Oct. 4, 1937	Batchelder & Snyder Co.
Beef Loins	2,350	Aug. 4, 1936	Oct. 4, 1937	Batchelder & Snyder Co.
Beef Ribs	1,767	Aug. 4, 1936	Oct. 4, 1937	Batchelder & Snyder Co.
Beef Ribs	8,129	Aug. 4, 1936	Oct. 4, 1937	Batchelder & Snyder Co.
Veal Livers	1,020	Aug. 10, 1936	Nov. 30, 1937	Armour & Co.
Pork Loins	1,500	June 25, 1936	July 25, 1937	Dubuque Packing Co.
Pork Loins	1,800	July 9, 1936	Aug. 9, 1937	Dubuque Packing Co.
Pork Tongues	1,980	Jan. 7, 1936	July 7, 1937	Brockelman Bros., Inc.
Venison	30	Nov. 2, 1936	Jan. 1, 1938	Smalley, B. A.
Bass, Striped	2,450	May 9, 1936	*Nov. 16, 1937	Busalacchi Bros.
Bass, Striped	5,000	May 11, 1936	*Nov. 16, 1937	Busalacchi Bros.
Bass, Striped	2,500	May 12, 1936	*Nov. 16, 1937	Busalacchi Bros.
Bass, Striped	3,835	May 14, 1936	*Nov. 16, 1937	Busalacchi Bros.
Bass, Striped	2,500	May 15, 1936	*Nov. 16, 1937	Busalacchi Bros.
Bass, Striped	2,300	May 16, 1936	*Nov. 16, 1937	Busalacchi Bros.
Bass, Striped	2,500	May 19, 1936	*Nov. 16, 1937	Busalacchi Bros.
Bass, Striped	900	May 21, 1936	*Nov. 16, 1937	Busalacchi Bros.
Bonitas	515	Aug. 26, 1936	Dec. 31, 1937	Genoa Fisheries, Inc.
Catfish Fillets	2,900	July 22, 1936	Dec. 23, 1937	General Seafoods Corp.
Catfish Fillets	130	May 2, 1936	July 31, 1937	O'Brien & Co., Inc., R.
Catfish Fillets	730	May 4, 1936	July 31, 1937	O'Brien & Co., Inc., R.
Catfish Fillets	140	May 5, 1936	July 31, 1937	O'Brien & Co., Inc., R.
Catfish Fillets	1,190	May 8, 1936	July 31, 1937	O'Brien & Co., Inc., R.
Catfish Fillets	670	May 13, 1936	July 31, 1937	O'Brien & Co., Inc., R.
Catfish Fillets	440	May 15, 1936	July 31, 1937	O'Brien & Co., Inc., R.
Catfish Fillets	210	May 23, 1936	July 31, 1937	O'Brien & Co., Inc., R.
Catfish Fillets	970	May 26, 1936	July 31, 1937	O'Brien & Co., Inc., R.
Catfish Fillets	240	May 29, 1936	July 31, 1937	O'Brien & Co., Inc., R.
Catfish, Skinned	105	Apr. 25, 1936	June 8, 1937	Genoa Fisheries, Inc.
Catfish, Skinned	210	May 1, 1936	June 8, 1937	Genoa Fisheries, Inc.
Catfish, Skinned	1,470	Apr. 9, 1936	July 1, 1937	Prior Co., P. H.
Catfish, Skinned	2,230	Apr. 17, 1936	July 1, 1937	Prior Co., P. H.
Catfish, Skinned	855	Apr. 24, 1936	July 1, 1937	Prior Co., P. H.
Catfish, Skinned	1,000	May 1, 1936	Aug. 1, 1937	Prior Co., P. H.
Catfish, Skinned	775	May 2, 1936	Aug. 1, 1937	Prior Co., P. H.
Catfish, Skinned	1,155	May 9, 1936	Aug. 1, 1937	Prior Co., P. H.
Catfish, Skinned	340	May 11, 1936	Aug. 1, 1937	Prior Co., P. H.
Catfish, Skinned	1,420	May 15, 1936	Aug. 1, 1937	Prior Co., P. H.
Catfish, Skinned	250	May 19, 1936	Aug. 1, 1937	Prior Co., P. H.
Catfish, Skinned	360	May 22, 1936	Aug. 1, 1937	Prior Co., P. H.
Catfish, Skinned	285	May 28, 1936	Aug. 1, 1937	Prior Co., P. H.
Catfish, Skinned	540	May 29, 1936	Aug. 1, 1937	Prior Co., P. H.
Catfish, Skinless	260	June 11, 1936	Aug. 1, 1937	Prior Co., P. H.

* The extension granted on this lot was amended before the expiration of the time to which extended. The length of time given includes the total amended period, and the weights given are the initial weights upon which extensions were asked.

TABLE 13.—*Requests for Extension of Time Granted on Goods in Cold Storage, from December 1, 1936 to December 1, 1937*—Continued

ARTICLE	Weight (Pounds)	Placed in Storage	Extension Granted to	Name
Cod, Dressed	7,495	May 15, 1936	Sept. 29, 1937	Arnold & Winsor Co.
Cod, Dressed	2,960	May 29, 1936	Sept. 29, 1937	Arnold & Winsor Co.
Cod Fillets	255	May 19, 1936	*Oct. 1, 1937	Atlantic Coast Fish. Corp.
Cod Fillets	435	July 6, 1936	Oct. 30, 1937	Atlantic Coast Fish. Corp.
Cod Fillets	2,145	July 31, 1936	Oct. 31, 1937	Atlantic Coast Fish. Corp.
Cod Fillets	465	May 2, 1936	July 29, 1937	Boston Fish Co.
Cod Fillets	10,340	May 7, 1936	Aug. 5, 1937	General Seafoods Corp.
Cod Fillets	2,240	June 8, 1936	Sept. 8, 1937	General Seafoods Corp.
Cod Fillets	1,605	Apr. 23, 1936	July 31, 1937	O'Brien & Co., Inc., R.
Cod Fillets	2,400	May 8, 1936	July 31, 1937	O'Brien & Co., Inc., R.
Cod Fillets	8,895	May 15, 1936	July 31, 1937	O'Brien & Co , Inc., R.
Cod Fillets	765	June 9, 1936	Dec. 16, 1937	O'Hara & Sons, Inc., F. J.
Cod Fillets	135	June 18, 1936	Dec. 16, 1937	O'Hara & Sons, Inc., F. J.
Cod, Skinless Fillets	3,195	Mar. 23, 1936	June 23, 1937	Busalacchi Bros.
Cod, Skinless Fillets	7,650	Mar. 31, 1936	Apr. 30, 1937	Busalacchi Bros.
Cod, Skinless Fillets	4,455	Apr. 2, 1936	June 23, 1937	Busalacchi Bros.
Cod, Steak Fillets	555	May 8, 1936	June 8, 1937	Burns Co., John
Cod Stix	2,000	Aug. 1, 1936	Dec. 1, 1937	Gorton-Pew Fish. Co., Ltd.
Cusk Fillets	540	May 6, 1936	July 31, 1937	O'Brien & Co., Inc., R.
Cusk Fillets	840	July 30, 1936	Oct. 28, 1937	Collins-Lee Co.
Cusk Fillets	330	July 31, 1936	Oct. 28, 1937	Collins-Lee Co.
Cusk, Skinless	610	June 27, 1936	Oct. 27, 1937	Collins-Lee Co.
Eels, Sand	1,675	June 15, 1936	*Dec. 20, 1937	Busalacchi Bros.
Eels, Sand	1,700	June 16, 1936	*Dec. 20, 1937	Busalacchi Bros.
Eels, Sand	125	June 18, 1936	*Dec. 20, 1927	Busalacchi Bros.
Eels, Sand	400	June 20, 1936	*Dec. 20, 1937	Busalacchi Bros.
Eels, Sand	1,275	June 23, 1936	*Dec. 20, 1937	Busalacchi Bros.
Eels, Sand	350	June 22, 1936	*Dec. 20, 1937	Busalacchi Bros.
Eels, Sand	1,300	July 27, 1936	Oct. 27, 1937	Busalacchi Bros.
Eels, Sand	1,250	Aug. 12, 1936	*Dec. 31, 1937	Busalacchi Bros.
Eels, Sand	3,150	Aug. 13, 1936	*Dec. 31, 1937	Busalacchi Bros.
Eels, Sand	3,000	Aug. 21, 1936	*Dec. 31, 1937	Busalacchi Bros.
Flounders, Dressed	434	July 22, 1936	Oct. 28, 1937	Collins-Lee Co.
Flounder Fillets	900	June 5, 1936	Aug. 5, 1937	O'Hara & Sons, Inc., F. J.
Flounder Fillets	195	June 6, 1936	Sept. 6, 1937	O'Hara & Sons, Inc., F. J.
Haddock Fillets	12,480	May 5, 1936	July 7, 1937	American Fish Co.
Haddock Fillets	2,160	June 8, 1936	July 8, 1937	American Fish Co.
Haddock Fillets	5,250	June 30, 1936	July 8, 1937	American Fish Co.
Haddock Fillets	315	May 29, 1936	July 29, 1937	Boston Fish Co.
Haddock Fillets	555	June 20, 1936	Aug. 20, 1937	Boston Fish Co.
Haddock Fillets	240	Aug. 15, 1936	Nov. 15, 1937	Boston Fish Co.
Haddock Fillets	600	Aug. 28, 1936	Nov. 15, 1937	Boston Fish Co.
Haddock Fillets	900	May 1, 1936	June 8, 1937	Burns Co., John
Haddock Fillets	510	May 8, 1936	June 8, 1937	Burns Co., John
Haddock Fillets	750	Mar. 6, 1936	June 6, 1937	Goodspeed, Inc., L. B.
Haddock Fillets	24,885	Mar. 1, 1936	July 1, 1937	Gorton-Pew Fish. Co., Ltd.
Haddock Fillets	1,680	Apr. 29, 1936	July 1, 1937	Gorton-Pew Fish. Co., Ltd.
Haddock Fillets	1,230	Aug. 1, 1936	Dec. 1, 1937	Gorton-Pew Fish. Co., Ltd.
Haddock Fillets	1,360	Aug. 28, 1936	Dec. 1, 1937	Gorton-Pew Fish. Co., Ltd.
Haddock Fillets	1,380	Aug. 28, 1936	Dec. 1, 1937	Gorton-Pew Fish. Co., Ltd.
Haddock Fillets	510	Mar. 5, 1936	June 1, 1937	Mantia & Sons, John
Haddock Fillets	1,635	Mar. 11, 1936	June 1, 1937	Mantia & Sons, John
Haddock Fillets	735	Mar. 24, 1936	June 1, 1937	Mantia & Sons, John
Haddock Fillets	1,455	Apr. 15, 1936	Aug. 31, 1937	Mantia & Sons, John
Haddock Fillets	300	Apr. 23, 1936	Aug. 31, 1937	Mantia & Sons, John
Hake Fillets	300	May 2, 1936	July 7, 1937	American Fish Co.
Hake Fillets	90	May 19, 1936	July 7, 1937	American Fish Co.
Hake Fillets	6,645	May 1, 1936	*Oct. 1, 1937	Atlantic Coast Fish. Corp.
Hake Fillets	240	May 2, 1936	*Oct. 1, 1937	Atlantic Coast Fish. Corp.
Hake Fillets	1,875	May 9, 1936	*Oct. 1, 1937	Atlantic Coast Fish. Corp.
Hake Fillets	270	May 28, 1936	*Oct. 1, 1937	Atlantic Coast Fish. Corp.
Hake Fillets	3,780	June 1, 1936	*Oct. 1, 1937	Atlantic Coast Fish. Corp.
Hake Fillets	345	Oct. 30, 1936	Jan. 30, 1938	Eastern Seafood Co.
Hake Fillets	225	May 5, 1936	July 31, 1937	O'Brien & Co., Inc., R.
Hake Fillets	270	May 29, 1936	July 31, 1937	O'Brien & Co., Inc., R.
Hake Fillets	870	June 19, 1936	July 23, 1937	O'Hara Bros. Co., Inc.
Hake Fillets	330	Apr. 23, 1936	Sept. 9, 1937	O'Hara & Sons, Inc., F. J.
Hake Fillets	900	May 9, 1936	Sept. 9, 1937	O'Hara & Sons, Inc., F. J.
Hake Fillets	1,440	May 28, 1936	July 28, 1937	O'Hara & Sons, Inc., F. J.
Hake Fillets	570	June 12, 1936	Dec. 16, 1937	O'Hara & Sons, Inc., F. J.
Hake Fillets	270	June 19, 1936	Dec. 16, 1937	O'Hara & Sons, Inc., F. J.
Hake Fillets	3,180	May 1, 1936	Aug. 1, 1937	Prior Co., P. H.
Hake Fillets	2,715	June 12, 1936	Aug. 1, 1937	Prior Co., P. H.
Halibut	10,975	Oct. 27, 1936	Feb. 27, 1938	Atlantic Halibut Co.
Halibut	2,327	Oct. 27, 1936	Feb. 27, 1938	Atlantic Halibut Co.
Halibut	861	Aug. 7, 1936	Nov. 1, 1937	General Seafoods Corp.
Halibut	1,300	Sept. 18, 1936	Jan. 3, 1938	General Seafoods Corp.
Halibut	5,712	Nov. 3, 1936	Jan. 3, 1938	Harding Co., F. E.
Halibut	9,871	Oct. 13, 1936	Dec. 31, 1937	New England Fish Co.
Halibut	2,800	Nov. 3, 1936	Dec. 15, 1937	New England Fish Co.

* The extension granted on this lot was amended before the expiration of the time to which extended. The length of time given includes the total amended period, and the weights given are the initial weights upon which extensions were asked.

TABLE 13.—*Requests for Extension of Time Granted on Foods in Cold Storage, from December 1, 1936 to December 1, 1937*—Continued

Article	Weight (Pounds)	Placed in Storage	Extension Granted to	Name
Halibut	5,000	Oct. 14, 1936	Feb. 14, 1938	Rich Co., Joseph A.
Halibut, Eastern	953	May 2, 1936	Sept. 7, 1937	General Seafoods Corp.
Halibut, Eastern	5,200	May 7, 1936	*Nov. 7, 1937	General Seafoods Corp.
Halibut Stix	4,455	Aug. 1, 1936	Dec. 1, 1937	Gorton-Pew Fish. Co., Ltd.
Mackerel	650	Apr. 28, 1936	July 28, 1937	Brockelman Bros.
Mackerel Fillets	1,545	June 10, 1936	July 18, 1937	O'Hara Bros. Co., Inc.
Mackerel Fillets	7,275	June 16, 1936	July 18, 1937	O'Hara Bros. Co., Inc.
Mackerel Fillets	1,500	June 19, 1936	July 23, 1937	O'Hara Bros. Co., Inc.
Mackerel Fillets	390	June 20, 1936	July 18, 1937	O'Hara Bros. Co., Inc.
Mackerel Fillets	5,325	June 20, 1936	July 18, 1937	O'Hara Bros. Co., Inc.
Mackerel Fillets	5,535	June 23, 1936	July 23, 1937	O'Hara Bros. Co., Inc.
Mackerel Fillets	105	June 23, 1936	July 23, 1937	O'Hara Bros. Co., Inc.
Mackerel Fillets	6,360	July 3, 1936	Aug. 3, 1937	O'Hara Bros. Co., Inc.
Mackerel Fillets	9,315	July 3, 1936	Aug. 3, 1937	O'Hara Bros. Co., Inc.
Mackerel Fillets	420	July 11, 1936	July 31, 1937	Phillips Co., B. F.
Mackerel Fillets	180	July 25, 1936	July 31, 1937	Phillips Co., B. F.
Perch Fillets	4,540	Nov. 12, 1936	Mar. 23, 1938	Frosted Foods Sales Corp.
Red Perch Fillets	135	May 12, 1936	June 12, 1937	Burns Co., John
Sea Perch	2,280	Oct. 10, 1936	Feb. 10, 1938	Frosted Foods Sales Corp.
Pollock Fillets	480	May 8, 1936	Aug. 8, 1937	Atlantic Coast Fish. Corp.
Pollock Fillets	330	May 13, 1936	Aug. 8, 1937	Atlantic Coast Fish. Corp.
Pollock Fillets	420	June 1, 1936	Aug. 15, 1937	Atlantic Coast Fish. Corp.
Pollock Fillets	135	June 15, 1936	Aug. 15, 1937	Atlantic Coast Fish. Corp.
Pollock Fillets	735	June 18, 1936	Aug. 15, 1937	Atlantic Coast Fish. Corp.
Pollock Fillets	804	May 12, 1936	Nov. 12, 1937	Boston Bay Fillet Co.
Pollock Fillets	2,606	May 13, 1936	Nov. 12, 1937	Boston Bay Fillet Co.
Pollock Fillets	16,120	Nov. 28, 1936	Mar. 23, 1938	Frosted Foods Sales Corp.
Pollock Fillets	17,100	Nov. 14, 1936	Mar. 16, 1938	General Seafoods Corp.
Pollock Fillets	1,425	July 18, 1936	Dec. 1, 1937	Gorton-Pew Fish. Co., Ltd.
Pollock Fillets	4,335	July 27, 1936	Dec. 1, 1937	Gordon-Pew Fish. Co., Ltd.
Sardine Herring	2,500	Oct. 26, 1936	Jan. 10, 1938	Busalacchi Bros.
Sardines	3,760	Nov. 23, 1936	Mar. 23, 1938	Frosted Foods Sales Corp.
Sardines	3,760	Nov. 14, 1936	Mar. 16, 1938	General Seafoods Corp.
Scallops	280	May 7, 1936	July 7, 1937	American Fish Co.
Scallops	130	May 14, 1936	July 7, 1937	American Fish Co.
Scallops	80	May 1, 1936	June 8, 1937	Genoa Fisheries, Inc.
Scallops	104	Oct. 8, 1936	Nov. 5, 1937	Hanley, M. J.
Scallops	699	Aug. 6, 1936	Nov. 6, 1937	Nagle & Co., John
Scallops	256	May 9, 1936	July 31, 1937	O'Brien & Co., Inc., R.
Scallops, Sea	2,955	July 9, 1936	*Jan. 12, 1938	Boston Bay Fillet Co.
Scallops, Sea	3,734	July 10, 1936	*Jan. 12, 1938	Boston Bay Fillet Co.
Scallops, Sea	3,911	July 14, 1936	*Jan. 12, 1938	Boston Bay Fillet Co.
Scallops, Sea	570	July 18, 1936	*Jan. 18, 1938	Boston Bay Fillet Co.
Scallops, Sea	2,534	July 27, 1936	*Jan. 31, 1938	Boston Bay Fillet Co.
Scallops, Sea	2,200	July 28, 1936	*Jan. 31, 1938	Boston Bay Fillet Co.
Scallops, Sea	7,189	Aug. 5, 1936	*Feb. 15, 1938	Boston Bay Fillet Co.
Scallops, Sea	4,966	Aug. 11, 1936	*Feb. 15, 1938	Boston Bay Fillet Co.
Scallops, Sea	4,275	Sept. 8, 1936	Dec. 30, 1937	Cahoon, Samuel T.
Scallops, Sea	136	May 16, 1936	Nov. 16, 1937	Genoa Fisheries, Inc.
Scallops, Sea	117	Aug. 20, 1936	Nov. 15, 1937	Goodspeed, Inc., L. B.
Scallops, Sea	1,215	Aug. 20, 1936	Nov. 15, 1937	Goodspeed, Inc., L. B.
Scallops, Sea	90	Oct. 9, 1936	Jan. 9, 1938	Goodspeed, Inc., L. B.
Scallops, Sea	180	Nov. 13, 1936	Mar. 1, 1938	Goodspeed, Inc., L. B.
Scallops, Sea	613	June 18, 1936	Dec. 18, 1937	Harding Co., F. E.
Scallops, Sea	3,160	July 10, 1936	Oct. 10, 1937	Powell & Nickerson
Scallops, Sea	440	July 18, 1936	Nov. 18, 1937	Rizzo, Angelo
Scrod Fillets	120	July 31, 1936	Oct. 31, 1937	Boston Fish Co.
Scup	1,500	May 5, 1936	Aug. 7, 1937	Busalacchi Bros.
Scup	6,000	May 6, 1936	*Nov. 7, 1937	Busalacchi Bros.
Scup	9,000	May 7, 1936	*Nov. 7, 1937	Busalacchi Bros.
Scup	2,600	May 8, 1936	*Nov. 7, 1937	Busalacchi Bros.
Scup	300	June 22, 1936	Sept. 19, 1937	Busalacchi Bros.
Scup	4,765	May 8, 1936	*Dec. 31, 1937	Mantia & Sons, J.
Shad	18,600	June 29, 1936	Sept. 29, 1937	Goodspeed, Inc., L. B.
Shad	1,000	June 29, 1936	Sept. 29, 1937	Goodspeed, Inc., L. B.
Smelts	1,800	Mar. 18, 1936	June 16, 1937	Brockelman Bros.
Smelts	1,252	Mar. 16, 1936	April 16, 1937	Brockelman Bros.
Smelts	675	Mar. 16, 1936	June 16, 1937	Brockelman Bros.
Smelts	4,500	Mar. 6, 1936	June 1, 1937	Busalacchi Bros.
Smelts	3,750	Mar. 13, 1936	June 1, 1937	Busalacchi Bros.
Smelts	7,440	Mar. 13, 1936	June 1, 1937	Busalacchi Bros.
Smelts	2,250	Jan. 31, 1936	*June 30, 1937	Busalacchi, T. & J.
Smelts**	1,125	Jan. 31, 1936	June 30, 1937	Busalacchi, T. & J.
Smelts**	1,500	Mar. 6, 1936	June 30, 1937	Busalacchi, T. & J.
Smelts	2,115	Mar. 11, 1936	June 1, 1937	Genoa Fisheries, Inc.
Smelts	4,800	Jan. 13, 1936	May 1, 1937	O'Hara & Sons, Inc., F. J.
Smelts	13,800	Mar. 9, 1936	June 1, 1937	O'Hara & Sons, Inc., F. J.
Smelts	5,100	Mar. 11, 1936	*Sept. 1, 1937	O'Hara & Sons, Inc., F. J.
Smelts	10,830	Mar. 11, 1936	*June 1, 1937	O'Hara & Sons, Inc., F. J

* The extension granted on this lot was amended before the expiration of the time to which extended. The length of time given includes the total amended period, and the weights given are the initial weights upon which extensions were asked.
**Animal Food.

TABLE 13.—*Requests for Extension of Time Granted on Goods in Cold Storage, from December 1, 1936 to December 1, 1937*—Concluded

Article	Weight (Pounds)	Placed in Storage	Extension Granted to	Name
Smelts	2,790	May 8, 1936	Sept. 9, 1937	O'Hara & Sons, Inc., F. J
Smelts	2,265	Mar. 9, 1936	June 9, 1937	Pier Fish Co.
Swordfish	2,126	Dec. 11, 1936	***Dec. 11, 1937	Gloucester Fresh Fish Co.
Swordfish	2,486	Dec. 11, 1936	***Dec. 11, 1937	Gloucester Fresh Fish Co.
Whiting	16,580	July 7, 1936	Oct. 3, 1937	Frosted Foods Sales Corp.
Whiting	12,480	July 30, 1936	Oct. 7, 1937	Frosted Foods Sales Corp.
Whiting	7,220	Aug. 3, 1936	Feb. 1, 1938	Frosted Foods Sales Corp.
Whiting	30,000	Aug. 4, 1936	Feb. 1, 1938	Frosted Foods Sales Corp.
Whiting	3,090	June 19, 1936	Sept. 21, 1937	Mariners Fish Co.
Whiting	2,190	June 23, 1936	Sept. 21, 1937	Mariners Fish Co.
Whiting	2,477	July 31, 1936	*Dec. 25, 1937	Trentacosta & Co., P.
Whiting, Butterfly	2,510	July 27, 1936	Dec. 1, 1937	Gorton-Pew Fish. Co. Ltd.
Whiting, Butterfly	1,730	Aug. 28, 1936	Dec. 1, 1937	Gorton-Pew Fish. Co., Ltd.
Whiting, Dressed	2,500	Oct. 7, 1936	Jan. 7, 1938	Busalacchi, T. & J.
Whiting, Dressed	30	July 24, 1936	Oct. 28, 1937	Collins-Lee Co.
Whiting, Dressed	4,650	June 29, 1936	Sept. 29, 1937	Genoa Fisheries, Inc.
Whiting, Dressed	7,370	June 30, 1936	*Dec. 31, 1937	Mantia & Sons, J.
Whiting, Dressed	6,380	July 1, 1936	*Dec. 31, 1937	Mantia & Sons, J.
Whiting Fillets	195	Oct. 10, 1936	Jan. 10, 1938	Busalacchi Bros.
Whiting Fillets	2,160	Oct. 10, 1936	Feb. 10, 1938	Frosted Foods Sales Corp.
Whiting Fillets	75	May 8, 1936	June 8, 1937	Genoa Fisheries, Inc.
Whiting Fillets	270	July 5, 1936	Oct. 5, 1937	Mariners Fish Co.
Whiting, Steak	31,980	June 8, 1936	Sept. 15, 1937	Boston Bay Fillet Co.
Whiting, Steak	10,145	June 13, 1936	Sept. 15, 1937	Boston Bay Fillet Co.
Whiting, Steak	12,465	June 15, 1936	Sept. 15, 1937	Boston Bay Fillet Co.
Whiting, Steak	9,750	June 16, 1936	Sept. 15, 1937	Boston Bay Fillet Co.
Whiting, Steak	5,355	June 17, 1936	Sept. 15, 1937	Boston Bay Fillet Co.
Whiting, Steak	18,570	June 18, 1936	Sept. 15, 1937	Boston Bay Fillet Co.
Whiting, Steak	17,340	June 19, 1936	Sept. 15, 1937	Boston Bay Fillet Co.
Whiting, Steak	35,625	June 20, 1936	Sept. 21, 1937	Boston Bay Fillet Co.
Whiting, Steak	19,980	June 22, 1936	Sept. 21, 1937	Boston Bay Fillet Co.
Whiting, Steak	3,285	June 1, 1936	Sept. 8, 1937	C. & W. Fisheries Co.
Whiting, Steak	11,985	June 5, 1936	Sept. 8, 1937	C. & W. Fisheries Co.
Whiting, Steak	23,570	June 6, 1936	Sept. 8, 1937	C. & W. Fisheries Co.
Whiting, Steak	15,060	June 8, 1936	Sept. 8, 1937	C. & W. Fisheries Co.
Whiting, Steak	18,735	June 13, 1936	Sept. 8, 1937	C. & W. Fisheries Co.
Yellow Tail Fillets	135	Aug. 28, 1936	Sept. 28, 1937	Burns Co., John

***Frozen and Undated.

*The extension granted on this lot was amended before the expiration of the time to which extended. The length of time given includes the total amended period, and the weights given are the initial weights upon which extensions were asked.

TABLE 14.—*Requests for Extension of Time Not Granted on Goods in Cold Storage, from December 1, 1936 to December 1, 1937*

Article	Weight (Pounds)	Placed in Storage	Name
Broilers	772	July 1, 1936	Berman & Co., Inc.
Broilers	1,153	July 1, 1936	Berman & Co., Inc.
Broilers	2,776	July 3, 1936	Berman & Co., Inc.
Broilers	388	July 3, 1936	Berman & Co., Inc.
Broilers	—	Sept. 11, 1936	First National Stores, Inc.
Broilers	—	Sept. 11, 1936	First National Stores, Inc.
Fowl	1,396	July 1, 1936	Berman & Co., Inc.
Fryers	—	Sept. 12, 1936	First National Stores, Inc.
Turkeys	3,877	Nov. 27, 1935	Armour & Co.
Turkeys	538	Nov. 27, 1935	Armour & Co.
Turkeys	664	Nov. 27, 1935	Armour & Co.
Turkeys	2,283	Mar. 19, 1936	Berman & Co., Inc.
Cusk Fillets	450	Sept. 25, 1935	Eastern Seafood Co.
Haddock Fillets	600	Apr. 25, 1936	Burns Co., John
Hake Fillets	330	Apr. 23, 1936	O'Hara & Sons, Inc., F. J.
Mackerel Fillets	5,880	June 13, 1936	O'Hara Bros. Co., Inc.
Octopus	450	*Nov. 10, 1936	Salem Street Market
Octopus	1,200	*Nov. 25, 1936	Salem Street Market
Sardines	900	Sept. 14, 1936	Eastern Seafood Co.
Scrod Fillets	45	Aug. 7, 1936	Boston Fish Co.
Smelts	4,035	Mar. 11, 1936	O'Hara & Sons, Inc., F. J.
Smelts	10,830	Mar. 11, 1936	O'Hara & Sons, Inc., F. J.
Smelts	1,095	May 8, 1936	O'Hara & Sons, Inc., F. J.

*Imported.

TABLE 15.—*Articles Which Had Been in Cold Storage Longer Than Twelve Months, and on Which No Requests for Extensions Had Been Made, Ordered Removed, from December 1, 1936 to December 1, 1937.*

ARTICLE	Weight (Pounds)	Placed in Storage	Name
Mixed Eggs	5,790	*Mar. 25, 1937	Cudahy Packing Co.
Mixed Eggs	1,200	July 25, 1936	Titman Corp., Benjamin
Sugaryolks	—	—	Armour & Co.
Sugaryolks	—	—	Armour & Co.
Sugaryolks	—	—	Armour & Co.
Sugaryolks	270	*Apr. 12, 1937	Winer, N.
Egg Whites	—	—	Armour & Co.
Egg Whites	—	—	Armour & Co.
Egg Whites	900	*Jan. 29, 1937	Frigid Food Products, Inc.
Egg Whites	6,600	*Apr. 12, 1937	Orenstein, Louis
Egg Whites	—	*Apr. 6, 1937	Rudnick, H.
Egg Whites	450	Apr. 22, 1936	Tranin Egg Products Co.
Egg Whites	11,790	*May 17, 1937	Tranin Egg Products Co.
Egg Whites	660	May 8, 1936	Wilston & Co.
Whole Eggs	14,520	Mar. 20, 1936	Armour & Co.
Whole Eggs	29,970	Apr. 7, 1936	Armour & Co.
Whole Eggs	750	*Jan. 16, 1937	Frigid Food Products, Inc.
Whole Eggs	1,050	*Jan. 29, 1937	Frigid Food Products, Inc.
Whole Eggs	4,350	*Apr. 12, 1937	Orenstein, Louis
Whole Eggs	30,000	*Jan. 9, 1937	Wilson & Co.
Whole Eggs	1,200	*Apr. 12, 1937	Winer, N.
Chickens	2,150	Nov. 30, 1935	Rosoff Co., T.
Chickens	—	—	Wilson & Co.
Fryers	—	Dec. 3, 1936	Land O'Lakes Creameries, Inc.
Fryers	—	Dec. 3, 1936	Land O'Lakes Creameries, Inc.
Turkeys	760	June 1, 1936	Armour & Co.
Turkeys	247	Dec. 21, 1935	Producers Dist. Agency
Turkeys	505	Dec. 21, 1935	Producers Dist. Agency
Beef	—	—	Smith, W. A.
Beef	908	Dec. 16, 1935	United Beef Co.
Beef Tenderloins	39	July 25, 1936	Armour & Co.
Lamb Flanks	160	Aug. 3, 1936	Barrett Co., E. T.
Spare Ribs	300	—	Armour & Co.
Bluefish	917	*Apr. 8, 1937	Atlantic Fish Co.
Catfish	650	Apr. 18, 1936	Busalacchi Bros.
Catfish, Skinned	1,495	Apr. 3, 1936	Busalacchi Bros.
Catfish, Skinned	1,300	Apr. 30, 1936	Busalacchi Bros.
Catfish, Skinned	325	May 14, 1936	Busalacchi Bros.
Catfish, Skinned	625	Apr. 2, 1936	Prior Co., P. H.
Cod Fillets	1,770	Mar. 20, 1936	Busalacchi Bros.
Cod Fillets	450	Sept. 25, 1936	Eastern Seafood Co.
Cod Fillets	90	June 5, 1936	Mariners Fish Co.
Eels, Sand	382	Oct. 8, 1936	Loverde, A.
Fish	—	—	Terlizzi, M.
Fish	—	—	Terlizzi, M.
Fish	—	—	Terlizzi, M.
Fish	—	—	Terlizzi, M.
Flounder Fillets	90	Sept. 11, 1936	Atlantic Coast Fish. Corp.
Flounder Fillets	270	Oct. 5, 1936	Atlantic Coast Fish. Corp.
Herring, S. & M.	600	Sept. 9, 1936	Busalacchi Bros.
Herring, Sardine	750	Sept. 14, 1936	Eastern Seafood Co.
Haddock Fillets	30	May 7, 1936	Goodspeed Inc., L. B.
Haddock Fillets	255	May 8, 1936	Goodspeed Inc., L. B.
Haddock Fillets	420	May 13, 1936	Goodspeed Inc., L. B.
Haddock Fillets	195	Nov. 30, 1935	Mantia Bros.
Haddock Fillets	15	*July 13, 1936	Portland Fish Co.
Hake Fillets	60	Apr. 30, 1936	Atlantic Coast Fish. Corp.
Hake Fillets	1,875	May 9, 1936	Atlantic Coast Fish. Corp.
Hake Fillets	105	Feb. 26, 1936	Fulham & Herbert
Hake, Steak	270	May 16, 1936	Busalacchi Bros.
Halibut, Chicken	400	*Jan. 14, 1937	New England Fish Co.
Perch Fillets	40	May 8, 1936	Feyler, R. E.
Pollock Fillets	570	Apr. 3, 1936	Atlantic Coast Fish. Corp.
Pollock Fillets	405	Apr. 8, 1936	Atlantic Coast Fish. Corp.
Pollock Fillets	30	Apr. 10, 1936	Atlantic Coast Fish. Corp.
Pollock Fillets	15	May 19, 1936	Busalacchi Bros.
Pollock Fillets	120	Apr. 23, 1936	Mantia & Sons Co., Inc., J.
Pollock Fillets	150	May 6, 1936	Mantia & Sons Co., Inc., J.
Pollock Fillets	7,470	*July 13, 1936	Portland Fish Co.
Pollock Fillets	9,000	*July 13, 1936	Portland Fish Co.
Pompano	135	*Feb. 6, 1937	Foley Co., M. F.
Scallops	747	Oct. 21, 1936	Brown, I.
Scallops, Sea	128	May 7, 1936	Goodspeed Inc., L. B.
Scallops, Sea	1,840	*Feb. 8, 1937	Hamilton, R. S.
Scup	571	June 3, 1936	Busalacchi Bros.
Scup	800	June 6, 1936	Tallman & Mack
Shark	470	Sept. 3, 1936	Busalacchi Bros.
Sole Fillets	30	May 7, 1936	Busalacchi Bros.
Sole Fillets	20	May 29, 1936	New England Fillet Co.
Swordfish	418	*Oct. 16, 1936	Supreme Market
Trout	45	*Oct. 29, 1936	Gilman, F. M.
Trout	120	*Oct. 29, 1936	Gilman, F. M.
Whiting	750	Oct. 7, 1936	Busalacchi Bros.
Whiting, Dressed	528	June 6, 1936	Busalacchi Bros.
Whiting, Round	210	Oct. 16, 1936	Busalacchi Bros.

*Received frozen and undated.

TABLE 16.—*Confiscations*

IN RESTAURANTS

Beef	15 lbs.	Decomposed
Beef	5 lbs.	Decomposed
Beef	1 lb.	Decomposed
Beef	5 lbs.	Decomposed
Beef	6 lbs.	Decomposed
Beef	3 lbs.	Decomposed
Beef	5 lbs.	Decomposed
Beef	6 lbs.	Decomposed
Beef	5 lbs.	Decomposed
Beef	3 lbs.	Decomposed
Beef	3 lbs.	Decomposed
Beef	½ lb.	Decomposed
Beef	2 lbs.	Decomposed
Beef	3 lbs.	Decomposed
Beef	1 lb.	Decomposed
Beef	2 lbs.	Decomposed
Beef	2 lbs.	Decomposed
Beef	2 lbs.	Decomposed
Beef	2 lbs.	Decomposed
Beef	2 lbs.	Decomposed
Beef	4 lbs.	Decomposed
Beef	2 lbs.	Decomposed
Beef	8 lbs	Decomposed
Beef	2 lbs.	Decomposed
Beef Kidneys	1 lb.	Decomposed
Beef Kidneys	2 lbs.	Decomposed
Beef Steak	¼ lb.	Decomposed
Hamburg	5 lbs.	Decomposed
Hamburg	2 lbs.	Decomposed
Hamburg	10 lbs.	Decomposed
Hamburg	2 lbs.	Decomposed
Hamburg	3 lbs.	Decomposed
Hamburg	2 lbs.	Decomposed
Hamburg	2 lbs.	Decomposed
Hamburg	5 lbs.	Decomposed
Hamburg	1 lb.	Decomposed
Hamburg	4 lbs.	Decomposed
Hamburg	½ lb.	Decomposed
Hamburg	1 lb.	Decomposed
Hamburg	½ lb.	Decomposed
Roast Beef	5 lbs.	Decomposed
Roast Beef	2 lbs.	Decomposed
Steak	1 lb.	Decomposed
Steak	2 lbs.	Decomposed
Steak	1 lb.	Decomposed
Steak	5 lbs	Decomposed
Steak	2 lbs.	Decomposed
Steak	2 lbs	Decomposed
Steak	1 lb.	Decomposed
Cube Steak	2 lbs.	Decomposed
Rump Steak	2 lbs.	Decomposed
Sirloin Steak	3 lbs.	Decomposed
Short Ribs Beef	4 lbs.	Decomposed
Lamb Chops	2 lbs	Decomposed
Lamb Chops	2 lbs	Decomposed
Ham	2 lbs.	Decomposed
Ham	¼ lb.	Mouldy
Ham	½ lb.	Decomposed
Ham, Sliced	1 lb.	Decomposed
Pork	2 lbs	Decomposed
Pork Chops	2 lbs.	Decomposed
Pork Chops	2 lbs.	Decomposed
Pork Chops	4 lbs	Decomposed
Pork Chops	2 lbs	Decomposed
Pork Chops	2 lbs.	Decomposed
Pork Chops	2 lbs.	Decomposed
Pork Chops	½ lb.	Decomposed
Frankforts	3 lbs	Decomposed
Frankforts	10 lbs.	Mouldy
Frankforts	25 lbs	Mouldy
Frankforts	4 lbs.	Decomposed
Frankforts	10 lbs.	Decomposed
Frankforts	1 lb.	Decomposed
Frankforts	1 lb.	Decomposed
Frankforts	1 lb.	Decomposed
Frankforts	2 lbs.	Decomposed
Frankforts	3 lbs.	Decomposed
Frankforts	4 lbs.	Decomposed
Frankforts	2 lbs.	Decomposed
Frankforts	2 lbs.	Mouldy
Frankforts	4 lbs.	Decomposed
Frankforts	1 lb.	Decomposed
Frankforts	2 lbs.	Mouldy
Frankforts	1 lb.	Mouldy
Frankforts	4 lbs.	Mouldy
Frankforts	20 lbs.	Mouldy
Frankforts	1 lb.	Mouldy
Frankforts	½ lb.	Decomposed
Frankforts	2 lbs.	Decomposed
Frankforts	3 lbs.	Decomposed
Frankforts	½ lb.	Decomposed

Table 16.—*Confiscations.*

In Restaurants — *Concluded*

Liver	5 lbs.	Decomposed
Meat Loaf	5 lbs.	Mouldy
Salami	1 lb	Decomposed
Sausages	2 lbs.	Decomposed
Soup Bones	2 lbs.	Rancid
Soup Meat and Bones	3 lbs.	Decomposed
Uncooked Hash	1 lb.	Decomposed
Veal	2 lbs.	Decomposed
Veal	2 lbs.	Decomposed
Fish	3 lbs.	Decomposed
Fish	3 lbs.	Decomposed
Crabmeat	½ lb.	Decomposed
Lobster	2 lbs.	Decomposed
Bread	½ loaf	Mouldy
Doughnuts	½ doz.	Contaminated
Butter	40 lbs.	Decomposed
Cheese, Sour Milk	4 lbs.	Decomposed
Blueberries	4 qts.	Decomposed
Beans	1 pt.	Sour
Peppers	1 lb.	Decayed
Tomatoes	2 lbs.	Decayed
Tomatoes	1 lb.	Decomposed
Tomatoes	1 qt.	Rancid
Tomatoes	5 lbs.	Mouldy
Turnips	½ bu.	Decayed
Sauerkraut	2 lbs.	Fermented
Gravy	1 qt.	Rancid
Grease	2 qts.	Rancid
Tomato Juice	1 qt.	Rancid
Tomato Soup	2 qts.	Rancid

In Stores, Markets, Etc.

Chickens	27 lbs.	Decomposed
Turkeys	75 lbs.	Decomposed
Beef	50 lbs.	Decomposed
Beef, Roast	10 lbs.	Decomposed
Beef Trimmings	40 lbs.	Decomposed
Beef, Brisket Corned	30 lbs.	Contaminated
Chopped Meat, Beef	55 lbs.	Decomposed
Rib Roast	4 lbs.	Decomposed
Hamburg	30 lbs.	Decomposed
Hamburg	38 lbs.	Decomposed
Hamburg	30 lbs.	Decomposed
Hamburg	1 lb.	Decomposed
Hamburg	5½ lbs.	Decomposed
Hamburg	20 lbs.	Decomposed
Hamburg	10 lbs.	Decomposed
Veal, Forequarter	16 lbs.	Decomposed
Veal Chops	2 lbs.	Decomposed
Lamb Legs	25 lbs.	Decomposed
Sausage Meat	45 lbs.	Decomposed
Pork Sausage	60 lbs.	Decomposed
Pork Sausage	5 lbs.	Decomposed
Pork Sausage	2 lbs.	Decomposed
Tomato Sausage	6 lbs.	Decomposed
Frankforts	1 lb.	Decomposed
Frankforts	10 lbs.	Decomposed
Hams, Pressed and Minced	215 lbs.	Decomposed
Kidneys	1½ lbs.	Decomposed
Meat Scraps	25 lbs.	Decomposed
Oysters in Shell	14 lbs.	Spoiled
Prunes	40 lbs.	Wormy

In Warehouses

Poultry	189 lbs.	Decomposed
Poultry	52 lbs.	Rancid
Turkeys	602 lbs.	Decomposed
Beef	1,504 lbs.	Contaminated
Beef (Backs)	894 lbs.	Decomposed
Beef (Rattles)	1,000 lbs.	Decomposed
Beef (Rounds and Flanks)	3,106 lbs.	Decomposed
Beef (Rumps and Loins)	2,827 lbs.	Decomposed
Beef (Tongues)	848 lbs.	Decomposed
Pork	903 lbs.	Tainted
Hams, Cooked	859 lbs.	Decomposed
Hog Lungs	3,709 lbs.	Decomposed
Game	85 lbs.	Decomposed
Ptarmigan	160 lbs.	Decomposed
Wild Birds	56 lbs.	Decomposed
Bloaters, Smoked	493 lbs.	Decomposed
Halibut	531 lbs.	Decomposed
Sole, Grey	1,375 lbs.	Decomposed
Sole, Grey	1,800 lbs.	Decomposed
Sole, Lemon	1,060 lbs.	Decomposed
Squid	4,200 lbs.	Decomposed
Total Confiscations	27,526½ lbs. 11½ qts ½ loaf ½ doz. ½ bu.	

TABLE 17.—*Summary of Inspections of Bakeries Made by the Division*

Number of such bakeries inspected		576
Number of defects found as follows: —		
Floors not properly constructed or maintained	77	
Walls not properly constructed or maintained	95	
Ceilings not properly constructed or maintained	81	
Storage facilities not properly constructed or maintained	18	
Apparatus not properly constructed or maintained	73	
Stock not properly protected	46	
Products not properly protected	54	
Flies abundant	16	
Flour storage unsatisfactory	33	
Tobacco used in bakery	40	
Absence of garbage can	44	
Domestic rooms connected with bakery	14	
Miscellaneous defects	85	
Total Defects		676

TABLE 18.—*Summary of Analyses of Miscellaneous Samples*

Character of Sample	Legal	Illegal	Total
Alkaline washing powder	1	–	1
Washing solutions from soft drink factories	15	41	56
Blood sample for arsenic	1	–	1
Fabric for arsenic	1	–	1
Silver polish for cyanide	1	–	1
Water used in cooking shellfish	3	–	3
Dirt from pipe lines in ice cream plant	–	1	1
Pickling solution for meat	1	–	1
Vacuum bottle for heavy metals	1	–	1
Mattress and upholstered furniture stuffing	17	45	62
Totals	41	87	128

PREPARATIONS EXAMINED FOR WOOD ALCOHOL

	Less Than 3% Methyl	More Than 3% Methyl	Total
Number of Samples	18	12	30

TABLE 19.—*Liquor Report*
Character of Samples

CITIES AND TOWNS	Beer	Cider	Wine	Distilled spirits	Extracts	Alcohol	Miscellaneous	Total
Boston	15	–	4	113	–	22	2	156
Cambridge	3	–	1	10	–	5	–	19
Gardner	1	–	–	7	–	3	–	11
Leominster	1	–	–	7	–	5	–	13
Lowell	–	–	–	10	–	1	–	11
Lynn	2	–	–	10	–	4	–	16
Malden	2	–	–	11	–	11	–	24
Springfield	10	–	9	57	–	1	1	78
A. B. C. Commission	51	–	14	95	–	–	–	160
Dept. Public Safety	7	1	1	8	–	–	–	17
Miscellaneous*	14	3	–	60	–	13	–	90
Total	106	4	29	388	–	65	3	595

* From 29 cities or towns submitting less than ten samples each.

TABLE 20.—*Drugs, Chemicals and Poisons Examined for Police Departments*

Character of Sample	Number of Samples
Heroin	16
Cannabis cigarettes	12
Opium	3
Codein	4
Ethyl morphine	1
Morphine	2
Hydroxyquinoline	2
Arsenic	1
Alleged poison bait found free from strychnine and cyanide	1
Sugar	1
Sodium bicarbonate	2
Starch, boric acid and saponin	1
Potassium permanganate pills	1
Samples free from narcotics	4
Total	51

REPORT OF THE DIVISION OF GENITOINFECTIOUS DISEASES

N. A. Nelson, M.D., *Director*

In General

The year 1937 has produced a wide advance along the whole line of genitoinfectious disease control, surpassing even the astonishing advance of 1936. Under the stimulus of the United States Public Health Service and with the cooperation of almost every channel of public information, the people of the United States have been stirred over gonorrhea and syphilis as never before in the field of communicable disease control. Public demand for more and more information has taxed the resources of the Division to the limit.

It is becoming more and more evident, however, that this sudden public awakening may lead to ill-advised and unsound action unless it becomes possible to direct the public insistence upon the control of syphilis and gonorrhea into proper channels. There is a somewhat alarming tendency to attempt to solve the problem by the passing of a variety of laws which would compel people to have blood tests performed for various reasons. Many people are developing a fear of syphilis and gonorrhea built upon the notion that either disease may be easily acquired by accident, and the disturbing custom of employers to discharge, summarily, their infected employees is extending by leaps and bounds.

The problem of syphilis and gonorrhea control today may be divided into three major parts—(1) sound public education, (2) case finding, (3) adequate treatment for the infected. So far as Massachusetts is concerned, the first of these three parts of the problem is at present the most important, for case finding and provision of treatment have advanced much more rapidly within the last year or two than public education.

Creation of a Division of Genitoinfectious Diseases

As of June 1, 1937, a Division of Genitoinfectious Diseases was created within the Department to replace the Subdivision of Venereal Diseases of the Division of Communicable Diseases. The Assistant Director of the Division of Communicable Diseases, who had been in charge of the program of the Subdivision of Venereal Diseases for the past ten years, was made Director of the new Division.

The staff of this new Division now consists of a director, two epidemiologists, two public health nursing supervisors, a part-time public health education worker and an office force of eight. Of these, one epidemiologist, both nurses and two of the office staff are paid their salaries from Federal funds, the remainder of the staff being paid from regular State appropriation.

The appropriation of the Division for 1937 amounted to $42,305, of which $29,000 were for operating expenses and $13,305 for salaries. As the result of an amendment of the General Laws, Chapter 111, Section 117, an additional appropriation of $50,000 was made for the last quarter of the fiscal year for the provision of treatment for syphilis and gonorrhea, the total appropriation from State funds, therefore, being $92,305. Federal funds to the amount of $29,500 were available for the year beginning July 1, 1937.

Statistical Summaries

The trend of reporting during the past several years is indicated by the following figures. A tremendous increase over the years in reports of syphilis from physicians reflects the influence of the control program in this State. It is difficult, however, to account for the steady decline in reporting of gonorrhea. Reports of this disease by physicians have remained almost stationary over the years and have declined very markedly from clinics. How much of the moderate increase in cases of syphilis reported by clinics during the last year is due to the effect of the new treatment law is difficult to say.

Sources of Reports of Gonorrhea

Year	Total Cases	Physicians			Clinics		Institutions	
		Number	Cases	Per Cent	Cases	Per Cent	Cases	Per Cent
1933	6,591	824	3,190	48.4	2,874	43.6	527	8.0
1934	6,538	845	3,164	48.4	2,825	43.2	549	8.4
1935	6,193	876	3,003	48.5	2,633	42.5	557	9.0
1936	6,097	958	3,268	53.6	2,280	37.4	549	9.0
1937	5,856	988	3,140	53.6	2,209	37.7	507	8.7

Sources of Reports of Syphilis

1933	4,466	428	911	20.4	2,867	64.2	688	15.4
1934	4,471	360	921	20.6	2,942	65.8	608	13.6
1935	5,317	703	1,472	27.7	2,783	52.3	1,062	20.0
1936	5,524	906	1,934	35.0	2,491	45.1	1,099	19.9
1937	6,207	961	2,103	33.9	2,788	44.9	1,316	21.2

In spite of this increase in the reporting of syphilis, it is apparent that all of the increase is due to the reporting of late cases rather than to an increase in the incidence of fresh infections, for the downward trend of reported early syphilis is continuing this year after a temporary halt in 1936.

Physicians Reporting Gonorrhea or Syphilis

Year	Reported Either or Both	First Report Since 1929	Accumulative Total	Reported, But Not This Year
1933	1,067	281	2,064	997
1934	1,051	200	2,264	1,213
1935	1,239	309	2,576	1,337
1936	1,432	313	2,889	1,457
1937	1,507	287	3,176	1,521

About 6,000 physicians in State in 1930 and 6,700 in 1937.

Communities Represented*

Year	1933	1934	1935	1936	1937
Number	254	283	287	280	292

*355 cities and towns in State.

There were 208 deaths from syphilis, a rate per 100,000 population of 4.7, as compared with a rate of 4.5 for 1936. If deaths from general paralysis of the insane and tabes dorsalis are included, the total of deaths from syphilis was 332, a rate of 7.5 per 100,000 population, as compared with 7.7 for 1936. It is impossible, of course, to estimate the actual death rate from syphilis because it is highly probable that many deaths from that disease are not so classified in the death certificates.

Provision of Treatment

On the 26th of August, 1937, an amendment to the General Laws, Chapter 111, Section 117, became effective. The law now requires that "the department shall, or with the cooperation of local boards of health, hospitals, dispensaries or other agencies may, establish and maintain clinics in such parts of the Commonwealth as it may deem most advantageous to the public health, and may otherwise provide treatment for such diseases subject to such rules and regulations as the department may from time to time establish. Cities and towns, separately or jointly, through their boards of health or municipal hospitals, may establish and maintain such clinics. For the purposes of this section, providing treatment shall include providing transportation or the reasonable cost of such transportation to and from the place where treatment is given whenever the patient is not able to pay for such transportation."

This new legislation made it necessary to completely readjust the Department's relationship with the thirty or more clinics in the State. All financial assistance, whether from State or Federal funds, which had been given to the majority of these clinics, was discontinued as of September 1st, and in place of lump sum subsidy the following plan of reimbursement was devised under this Department's regulation.

Those clinics which make application, and whose applications are accepted, are

designated as cooperating clinics. Upon the submission of vouchers for each visit of each patient or bona fide contact, the clinic is reimbursed at a rate not to exceed seventy-five cents per visit. At the end of each fiscal year further adjustment is made in the event that reasonable cost of clinic maintenance has exceeded receipts. Twenty-two clinics have already been designated as cooperating clinics and are being reimbursed. Several others have applied for such designation. It is anticipated that it will cost approximately $200,000 annually to maintain reasonably adequate clinic service.

As the result of this new system of reimbursement, which relieves local agencies of the cost of providing clinic service, it has been possible to add new follow-up personnel to some clinics and to transfer that follow-up personnel which had been paid from Federal funds to the more permanent State appropriation. Thus the entire clinic service is now established as a function of the State, and eleven follow-up workers have been added to clinic personnel. In two or three clinics, furthermore, the addition of clerical service has relieved existing follow-up service for its proper function in the field.

Most of the major clinics in the State were granted funds from Federal appropriation, to a total amount of approximately $9,000, with which to purchase clinic equipment, most of which has been badly needed for many years.

This plan of clinic reimbursement is ideal in that it leaves with the local agency full administrative responsibility for the clinic service. It thus eliminates the bickerings and confusion which would arise from joint administrative responsibility and leaves the Department simply in the position of paying those clinics which meet its standards for services rendered. If there is local political interference which makes it impossible for the clinic to meet the Department's standards, the designation of the clinic as a cooperating clinic may be promptly withdrawn.

The plan of providing treatment also includes the reimbursement of hospitals for the hospital care of patients with syphilis or gonorrhea and for the reimbursement of physicians for the treatment of patients who for good reason cannot reach or cannot attend a cooperating clinic. By the end of the year, twenty-four hospitals and forty-five physicians had been reimbursed for this type of service, and out of a total expenditure of $44,000, 86.3 per cent was paid to clinics, 10.7 per cent to hospitals and 3.0 per cent to physicians. At the rate of disbursement for the month of December, the total treatment service for the year will be approximately $210,000.

The twenty-seven clinics in the State admitted 2,185 new cases of gonorrhea and 2,780 new cases of syphilis, a decline of approximately 200 cases of gonorrhea and an increase of 100 cases of syphilis over 1936. These patients made 261,463 visits, an increase of approximately 800 over 1936.

The six major Boston clinics which last year entered into an unusual joint follow-up project, have continued with the project. This service has proved to be so satisfactory that it will doubtless remain as a permanent feature of the local clinic program.

A new clinic has been established at the Waltham Hospital; the Boston Dispensary has resumed its Wednesday evening clinic so that there are now three evening clinics at that institution; the Massachusetts Memorial Hospitals has opened a Thursday evening clinic for domestics so that there are now two evening clinics at that hospital; the Newton Hospital has opened a Wednesday evening clinic; the Cambridge Hospital has opened a gonorrhea clinic in addition to its syphilis service; the Fitchburg clinic operates two clinics a week instead of one as formerly; the Boston City Hospital clinic treats syphilis six mornings a week instead of three; and a clinic has been opened at the Fairview Hospital in Great Barrington as an experiment in a small community.

In connection with the reimbursement of physicians for the treatment of patients unable to attend clinics, it was necessary to seek the advice of a committee of physicians made up of experts in the management of syphilis and gonorrhea and of duly appointed representatives of the Massachusetts Medical Society, which committee agreed that the Department should require more specific information from physicians concerning the diagnosis and plan of treatment.

Follow-Up by Boards of Health

Although there has been some slight reduction in the number of cases reported to the Department by name, the reduction has not been as great as it was hoped it would be as the result of the considerable additions to follow-up service in the clinics. The per cent of patients found increased again this year to 52.3 per cent.

Follow-up By Boards of Health

Year	Cases	Per Cent Found	Number of Communities	No Report from Board of Health Per Cent of Cases	Communities
1933 . .	3,989	45.0	135	5.6	44
1934 . .	3,578	45.8	153	4.9	50
1935 . .	3,637	47.3	140	5.0	38
1936 . .	3,663	51.3	157	5.0	39
1937 . .	3,339	52.3	146	4.9	28

Follow-up Service for Private Physicians

Although this service was temporarily interrupted by a resignation and because of delay in the certification of candidates through the Department of Civil Service could not be brought to its full strength until late in the year, it has proved to be reasonably popular with physicians. During such parts of the year as these two workers have been available, they have interviewed more than 200 physicians, nearly 100 of whom have referred 250 patients for follow-up, to which patients the workers have made over 400 visits, exclusive of letters and telephone calls.

Follow-up Service in Syphilis in Pregnancy

Beginning September 1st, nine Metropolitan Boston hospitals and the Community Health Association accepted a cooperative follow-up service for syphilis in pregnancy. A full-time nurse follow-up worker, with headquarters at the Boston Lying-in Hospital, follows pregnant women with syphilis from the Boston Lying-in Hospital, the Massachusetts Memorial Hospitals, the Boston City Hospital and the New England Hospital for Women and Children, in order to make sure that their treatment for syphilis is adequately carried on through pregnancy at the several cooperating syphilis clinics in the group, namely, the Beth Israel Hospital, the Boston City Hospital, the Boston Dispensary, the Massachusetts General Hospital, the Massachusetts Memorial Hospitals, the Peter Bent Brigham Hospital and the New England Hospital for Women and Children.

This worker seeks to coordinate the services of the Community Health Association and the follow-up workers in the several clinics in relation to the treatment of syphilis in pregnancy. The Children's Hospital is also a member of this group since it handles many of the infants who are discovered to have congenital syphilis and also because, in cooperation with some of the maternity clinics, it has made extensive studies of the relation of syphilis in pregnancy and congenital syphilis.

This service is being supported by Federal funds.

Other Diagnostic and Treatment Services

Arsenicals:

There was a considerable increase in the amount of arsenicals distributed in 1937 over 1936. In 1937, 54,505 grams of standard arsenical were distributed. In addition, 546.2 grams of mapharsen were also distributed to clinics for the treatment of patients who cannot tolerate standard arsenical. This is equivalent to 5,462 grams of standard arsenical, so that the total distribution in terms of standard arsenical amounted to nearly 60,000 grams. This is approximately 4,000 grams more arsenical than the Department has ever before distributed in a single year. This increase in distribution has been almost entirely to physicians, they having received 31.4 per cent of the standard arsenicals distributed, as compared to 25.3 per cent last year, and the number of physicians who use State arsenicals has increased from 495 in 1936 to 602 in 1937.

Bismuth:

The distribution of bismuth subsalicylate to clinics was begun in 1936, and in 1937 this drug was also offered to physicians. On the basis of 1 c.c. per dose, some

146,856 doses were distributed in 1937, as compared to approximately 60,000 doses in 1936.

Laboratory:

The Wassermann Laboratory reported 194,621 blood and spinal fluid examinations as compared to 151,544 in 1936, and the Bacteriological Laboratory reported 13,621 smears examined for gonorrhea as compared to 11,734 in 1936.

The Hinton test as performed in the State Wassermann Laboratory continues to hold its place well up among the leaders in the evaluation of the various serological tests as performed by the United States Public Health Service.

Education and Information

During the year the staff lectured to 98 groups, professional and public, and thus directly reached approximately 7,500 persons. One radio broadcast was given in December in cooperation with the Massachusetts Federation of Women's Clubs.

During the year there were distributed 207,722 pieces of literature as compared with approximately 107,000 pieces in 1936 and 72,000 pieces in 1935. In cooperation with the Massachusetts Medical Society, the Massachusetts Neisserian Medical Society and the Massachusetts Society for Social Hygiene, a Bulletin of Genitoinfectious Diseases has been distributed, each month, to all the physicians in the State, beginning with September. This Bulletin has attracted a great deal of attention not only in this State but throughout the United States.

The newspapers of Massachusetts have been exceedingly generous in giving space to discussion of syphilis and gonorrhea. In this connection, it is to the credit of the Berkshire Evening Eagle, the Pittsfield Board of Health, the Berkshire County Medical Society and the Pittsfield Council of Social Agencies that they have together produced an enormous amount of very excellent newspaper material for public information.

Training of Personnel

The Simmons College School of Nursing repeated its summer session for the study of gonorrhea and syphilis begun in 1936 under the direction of Dr. Nelson and Miss Crain of this Department. The Harvard School of Public Health was accepted by the United States Public Health Service as a center for the training of health officers and physicians in syphilis and gonorrhea control. A nine months' course of training has been established for health officers and short clinical courses for physicians. The Director of this Division participates in instruction under this course from the point of view of administration of the control program.

Miscellaneous

The Director of the Division and Miss Gladys Crain, R.N., Epidemiologist, were appointed to the Advisory Committee in Medicine and Public Health of the 1939 World's Fair in New York, and Miss Crain read a paper at the annual meeting of the American Public Health Association in New York City.

Table I.—*Gonorrhea*

Year	Cases	Case Rate per 100,000	Deaths	Death Rate per 100,000
1933	6,591	152.6	7	0.2
1934	6,538	150.7	11	0.3
1935	6,193	142.0	7	0.2
1936	6,097	139.1	17	0.4
1937	5,856	133.0	13	0.3

TABLE II.—*Syphilis*

Year	Cases	Case Rate per 100,000	Deaths	Death Rate per 100,000
1933	4,466	103.4	154	3.6
1934	4,471	103.0	159	3.7
1935	5,317	121.9	177	4.1
1936	5,524	126.0	196	4.5
1937	6,207	140.9	208	4.7

TABLE III. — *General Paralysis of the Insane*

	Deaths		First Admissions to State Institutions for Mental Diseases		
Year	Deaths	Death Rate per 100,000	First Admissions	Rate per 100,000	Per Cent of All First Admissions
1933	147	3.4	303	7.0	4.3
1934	161	3.7	351	8.1	4.5
1935	128	2.9	281	6.4	4.9
1936	102	2.3	234	5.4	3.9
1937	89	2.0	167	3.8	3.4

TABLE IV.—*Gonorrhea and Syphilis Treated in Clinics and Institutions*

Clinics

Year	New Cases		Visits	Number of Clinics
	Gonorrhea	Syphilis		
1933	3,085	3,061	262,061	26
1934	3,003	2,992	268,520	26
1935	2,717	2,968	272,887	26
1936	2,388	2,679	260,602	26
1937	2,185	2,780	261,463	27

*Institutions**

Year	New Cases		Number of Institutions
	Gonorrhea	Syphilis	
1933	464	946	24
1934	435	803	24
1935	557	1,062	24
1936	395	892	24
1937	270	1,054	24

* From Monthly Reports.

TABLE V.—*Grams of Arsphenamine, Sulpharsphenamine, Neoarsphenamine and Mapharsen Distributed*

YEAR	Arsphenamine	Sulpharsphenamine	Neoarsphenamine	Mapharsen*	Total
1933	7,984	4,339	37,080	–	49,403
1934	8,037	4,453	42,407	–	54,897
1935	7,138	3,508	45,184	–	55,830
1936	6,895	2,905	43,714	1,368	54,882
1937	7,458	3,397	43,650	5,462	59,967

* Arsphenamine equivalent.

TABLE VI.—*Grams of Arsenicals (exclusive of Mapharsen) Distributed to Clinics Institutions and Physicians*

	CLINICS AND INSTITUTIONS	PHYSICIANS		
YEAR	Grams	Grams	Per Cent of Total	Number of Physicians
1933	41,549	7,854	15.9	342
1934	44,284	10,613	19.3	418
1935	43,000	12,830	23.0	489
1936	39,977	13,537	25.3	495
1937	37,395	17,110	31.4	602

REPORT OF THE DIVISION OF SANITARY ENGINEERING

Arthur D. Weston, *Director and Chief Engineer*

Oversight and Care of Inland Waters

During the year 1937 the Division of Sanitary Engineering investigated 994 applications requiring the advice of the Department, of which 207 related to municipal water supplies, 263 to private water supplies called to the attention of the Department by local health authorities, 28 to water supplies at schools, 67 to water supplies at camps, 7 to ice supplies, 44 to waters used for bathing, 36 to shellfish, 16 to pollution of streams, 84 to sewerage and sewage disposal, 159 to cross connections in piping systems and 83 to miscellaneous matters. The number of applications received during the year 1937 was the largest ever received by the Department and is 16.0 per cent in excess of the number received during the year 1936 and 43.2 per cent in excess of the number received during the year 1935. These applications have required in most cases field examinations by engineers and the collection of samples of water or sewage for chemical analysis by the Water and Sewage Laboratories and bacterial examination by the Lawrence Experiment Station. In addition some of the applications have required field examinations by the chemists.

Water Supplies

Examination of Public Water Supplies

A public water supply was introduced during the year 1937 in the Buzzards Bay Water District in the town of Bourne, but no municipal supplies were introduced. This increased the number of cities and towns now supplied in part at least with water from public water supplies to 249. Included in this number are several small towns supplied only in part by water companies, industrial plants or by other towns. The municipalities not provided with public water supplies, together with their population according to the 1935 census, are shown in the following table:

Town	Population	Town	Population
Alford	210	Goshen	257
Ashby	957	Gosnold	129
Becket	723	Granby	956
Bellingham	3,056	Greenwich	219
Berkley	1,156	Halifax	817
Berlin	1,091	Hamilton	2,235
Bolton	739	Hampden	854
Boxborough	404	Hancock	408
Boxford	726	Harvard	952
Boylston	1,361	Hawley	308
Brewster	715	Heath	368
Brimfield	892	Holland	201
Burlington	2,146	Hubbardston	1,000
Carlisle	688	Lakeville	1,443
Carver	1,559	Lanesborough	1,237
Charlemont	923	Leverett	726
Charlton	2,366	Leyden	253
Chesterfield	445	Lunenburg	2,124
Chilmark	253	Mashpee	380
Clarksburg	1,335	Mendon	1,265
Conway	952	Middlefield	220
Dana	387	Millville	1,901
Dennis	2,017	Montgomery	174
Dighton	3,116	Mt. Washington	64
Dover	1,305	New Ashford	94
Eastham	606	New Braintree	436
Enfield	495	Newbury	1,576
Essex	1,486	New Marlborough	921
Florida	405	New Salem	443
Freetown	1,813	Norfolk	2,073
Gay Head	158	Norwell	1,666

Town	Population	Town	Population
Oakham	441	Sherborn	994
Orleans	1,425	Shutesbury	239
Otis	415	Stow	1,190
Pelham	504	Swansea	4,327
Peru	151	Templeton	4,302
Petersham	718	Tewksbury	6,563
Phillipston	423	Tolland	141
Plainfield	332	Topsfield	1,113
Plympton	558	Truro	541
Prescott	18	Tyngsborough	1,331
Princeton	707	Tyringham	243
Raynham	2,208	Upton	2,163
Rehoboth	2,777	Wales	382
Richmond	628	Warwick	565
Rochester	1,229	Washington	252
Rowe	277	Wellfleet	948
Rowley	1,495	Wendell	397
Royalston	841	Wenham	1,196
Sandisfield	471	Westport	4,355
Sandwich	1,516	W. Tisbury	282
Savoy	299	Whately	1,133
Seekonk	5,011	Windsor	412

The following tables summarize the major additions and improvements made in connection with public water supplies in the State during the year 1937:

Improvements and Extensions:		
Dracut (Dracut Water Supply District)		New tubular wells (completed).
Holliston (Holliston Water Co.)		Gravel-packed well (completed).
Newton		Two new dug wells (completed).
Pittsfield		New reservoir on Sand Wash Brook (completed).
Southbridge (Southbridge Water Supply Company)		New reservoir on Hatchet Brook (completed).
Wellesley		Gravel-packed well (completed).
West Springfield		Gravel-packed test wells and pumping test.
Woburn		Two gravel-packed wells (completed).
Treatment Works Completed or Under Way:		
Athol	Surface water supply	Rapid sand filters (completed).
Attleboro	Dug and gravel-packed wells	Aerator and chemical treatment works (completed).
Lawrence	Merrimack River	Rapid sand filters (under construction).
Monroe (Monroe Water District)	Phelps Brook Reservoir	Slow sand filters (plans approved).
Norwood	Tubular Wells	Iron removal plant (completed).
Russell	Surface water supply	Slow sand filters (completed).
Chemical Treatment for Corrosiveness		
Attleboro	Dug and gravel-packed wells	Aeration and lime treatment.
Chlorinators and Ammoniators Installed		
Dalton	Surface Water Supply	Emergency chlorinator installed.
Fall River	North Watuppa Pond	Ammoniator installed.
Hatfield	Running Gutter Brook Reservoir	Emergency chlorinator installed
Metropolitan Water District	Weston Reservoir	Ammoniator installed.
	Chestnut Hill Reservoir	Chlorinator installed.
Northampton	Mountain Street Reservoir	Chlorinator installed.
North Brookfield	North Pond and Doane Pond	Chlorinator installed.
Southbridge (Southbridge Water Supply Company)	Hatchet Brook Reservoir	Emergency chlorinator installed.
Westfield	Montgomery supply	Chlorinator installed.

During the year 1937 this Division continued its examinations of the watersheds of public water supplies, sufficient funds having been made available by the United States Public Health Service for the employment of four engineers for such work.

During the latter part of the year 1936, three additional engineering districts were organized in the State, which, with the district already established for the Connecticut Valley and Berkshire County, divide the State into four sanitary engineering districts. This arrangement has operated successfully. It has permitted the Division to render an increased amount of service and to be of great assistance in cases of emergency.

The following tables show the average results of chemical analyses of samples of water collected from various sources of public water supply during the year 1937:

Analyses of the Water of Public Water Supplies—Averages of Chemical Analyses of Surface Water Sources for the Year 1937

[Parts per Million]

City or Town	Source	Color	Residue on Evaporation	Ammonia		Nitrogen as Nitrates	Chlorides	Hardness	Alkalinity	pH	Fe	Oxygen Consumed	No. of Samples
				Free	Total Albuminoid								
Metropolitan Water District	Wachusett Reservoir, upper end	25	37	.014	.089	.08	2.4	15	9	–	.08	–	23
	Wachusett Reservoir, lower end	14	36	.008	.091	.07	2.5	15	9	–	.07	–	23
	Sudbury Reservoir	17	40	.007	.127	.08	3.1	18	9	–	.09	–	12
	Framingham Reservoir No. 3	20	40	.007	.114	.09	3.4	17	9	–	.16	–	9
	Ware River at Coldbrook intake	51	39	.014	.118	.07	1.7	11	–	–	.40	–	10
	Hopkinton Reservoir	49	42	.007	.145	.09	3.1	12	7	–	.18	7.4	9
	Ashland Reservoir	49	45	.007	.162	.09	4.2	13	7	–	.19	7.2	9
	Framingham Reservoir No. 2	71	62	.030	.174	.11	10.4	19	7	–	.70	9.0	9
	Lake Cochituate	22	73	.106	.166	.29	7.9	31	15	–	.17	–	9
	Chestnut Hill Reservoir	15	42	.080	.104	.10	4.0	19	10	–	.17	–	12
	Weston Reservoir	16	40	.021	.097	.08	3.1	18	9	–	.10	–	12
	Spot Pond	10	37	.007	.109	.07	3.9	17	9	–	.09	–	12
	Tap in State House	16	41	.047	.098	.09	4.0	18	9	–	.16	–	10
	Tap in Revere	11	43	.005	.090	.06	4.0	13	10	–	.14	–	12
	Tap in Quincy	10	41	.005	.063	.13	4.1	21	12	–	.10	–	12
Abington	Big Sandy Pond	8	36	.110	.106	.06	8.3	7	6	–	.12	–	11
Acushnet (Fire and Water District)	New Bedford Water Supply												
Adams (Fire District)	Bassett Brook Reservoir	5	32	.006	.061	.09	1.3	23	14	–	.09	–	4
Agawam	Springfield Water Supply												
Amherst (Water Co.)	Atkins Pond	11	26	.016	.139	.06	1.5	7	5	–	.18	–	11
	Amethyst Brook-Intake Reservoir	36	33	.003	.091	.09	1.5	6	5	–	.10	–	4
Andover	Haggett's Pond	15	45	.012	.135	.08	5.1	22	11	–	.06	–	5
Arlington	Metropolitan Water Supply												
Ashburnham	Upper Naukeag Lake	13	27	.016	.043	.05	1.8	7	5	–	.33	–	4
Ashfield (Water Co.)	Highland Spring Reservoir	27	51	.004	.086	.20	1.2	31	26	–	.32	–	3
Athol	Buckman Brook Reservoir (Newton Reservoir)	30	32	.006	.137	.08	1.4	10	5	–	.11	–	9
	Thousand Acre Meadow Brook	173	57	.026	.270	.11	1.6	14	7	–	.28	19.3	9
	New Filtration Plant (raw water)	42	32	.020	.180	.09	1.7	9	6	6.1	.42	8.2	7
	New Filtration Plant (filter effluent)	4	52	.022	.048	.09	1.9	24	17	7.0	.08	–	7
	Phillipston Reservoir	62	39	.018	.232	.11	2.8	14	7	6.4	.27	10	9
Barre	Reservoir	17	39	.006	.115	.08	1.5	13	9	–	.18	–	3
Belmont	Metropolitan Water Supply												
Beverly	Joint supply with Salem												
Blandford (Fire District)	Freeland Brook	8	32	.001	.015	.20	1.7	16	13	–	.08	–	3
Boston	Metropolitan Water Supply												
Braintree	Great Pond (raw water)	44	57	.007	.174	.30	7.4	21	11	6.6	.18	7.1	6
	Great Pond, filtered	4	70	.017	.067	.37	7.7	30	14	7.1	.05	–	6

Brockton	Silver Lake	9	37	.005	.106	.06	6.3	8	6	–	.09	–	12
Brookfield	Cooley Hill Reservoir	17	33	.005	.108	.06	2.0	11	6	–	.16	–	4
Cambridge	Upper Hobbs Brook Reservoir	49	75	.024	.250	.25	5.1	29	13	–	.25	8.5	12
	Lower Hobbs Brook Reservoir	16	59	.019	.196	.16	5.2	28	12	–	.11	–	12
	Stony Brook Reservoir	40	73	.017	.182	.29	6.1	32	17	–	.16	6.9	12
Cambridge	Fresh Pond	11	81	.029	.141	.36	7.2	37	20	6.9	.07	–	12
	Filter effluent	3	88	.028	.065	.40	7.0	45	22	8.5	.07	–	12
Chelsea	Metropolitan Water Supply												
Cheshire (Water Co.)	Kitchen Brook Reservoir	5	52	.019	.038	.07	1.2	37	33	–	.07	–	3
Chester	Austin Brook Reservoir	18	38	.008	.070	.06	1.1	17	9	–	.16	–	3
	Horn Pond	22	36	.013	.137	.05	1.1	17	11	–	.07	–	3
Chicopee	Cooley Brook Reservoir, raw water	46	49	.019	.159	.53	2.0	20	12	6.7	.17	6.9	10
	Cooley Brook Reservoir, filtered	5	59	.015	.027	.46	2.6	30	14	7.4	.08	–	10
	Morton Brook	8	62	.018	.040	2.0	3.8	24	10	–	.34	–	10
Clinton	Lower Lynde's Reservoir	22	35	.029	.113	.07	1.7	15	10	–	.14	–	4
	Heywood Pond	15	28	.015	.143	.06	1.5	10	4	–	.11	–	4
	Spring Basin	12	45	.012	.098	.12	2.2	21	12	–	.09	–	4
Colrain (Griswoldville)	McClellan Brook Reservoir	5	61	.000	.028	.06	1.4	38	33	–	.05	.00	1
Colrain (Fire District No. 1)	Mountain Brook Reservoir	6	76	.005	.031	.06	1.2	59	55	–	.15	–	2
Concord	Nagog Pond	7	30	.005	.103	.05	3.7	10	6	–	.07	–	4
Dalton	Egypt Brook Reservoir	24	31	.005	.063	.08	1.1	12	6	–	.15	–	3
	Tap in town	32	39	.009	.100	.08	1.4	20	11	–	.18	–	3
	Windsor Reservoir	41	56	.017	.110	.08	1.1	28	23	–	.50	–	2
Danvers	Middleton Pond	48	47	.024	.180	.15	4.1	17	9	–	.15	8.4	6
	Swan Pond	30	45	.015	.169	.12	4.1	17	10	–	.11	–	6
Dartmouth	New Bedford Water Supply												
Deerfield (South Deerfield Water Supply District)	Roaring Brook Reservoir	8	68	.004	.034	.06	1.5	41	38	–	.06	–	4
East Bridgewater	Brockton Water Supply												
East Longmeadow	Springfield Water Supply												
Egremont (South Egremont Water Co.)	Goodale Brook Reservoir	1	41	.004	.029	.20	1.4	28	22	–	.10	–	2
Erving (Millers Falls Fire and Water District)	Montague (Turners Falls Fire District) Water supply												
Everett	Metropolitan Water Supply												
Fall River	North Watuppa Lake	11	36	.061	.119	.07	5.6	9	3	–	.11	–	11
Falmouth	Long Pond, before lime treatment	3	36	.007	.074	.05	10.1	7	5	6.6	.05	–	6
	Long Pond, treated	7	40	.007	.056	.05	10.1	16	14	9.0	.15	–	6
Fitchburg	Ashby Reservoir	20	27	.029	.131	.06	1.7	7	5	–	.43	4.5	10
	Scott Reservoir	17	29	.007	.149	.06	1.6	9	5	–	.14	–	3
	Meetinghouse Pond	11	25	.016	.120	.06	1.7	8	5	–	.06	–	4
	Wachusett Lake	11	25	.005	.112	.06	1.8	7	5	–	.09	–	4
	Falulah Brook	24	25	.013	.085	.07	1.5	7	4	–	.19	–	4
	Lovell Reservoir	23	27	.007	.099	.07	1.6	6	3	–	.20	–	4
Framingham	Tap in Pumping Station	12	60	.068	.086	.09	8.2	28	19	–	.16	–	10
Gardner	Crystal Lake	28	48	.051	.171	.09	3.8	22	16	–	.50	–	4
Gloucester	Haskell Reservoir	10	35	.002	.064	.06	8.4	5	3	–	.17	–	5
	Dike's Brook Reservoir	31	40	.017	.099	.06	8.8	5	4	–	.68	4.0	5
	Wallace Reservoir	15	37	.006	.108	.06	9.9	5	4	–	.23	–	5
	Babson Reservoir	55	53	.032	.134	.08	11.9	10	5	–	.52	7.6	5

Averages of Chemical Analyses of Surface-Water Sources, etc.—Continued

[Parts per Million]

City or Town	Source	Color	Residue on Evaporation	Ammonia		Nitrogen as Nitrates	Chlorides	Hardness	Alkalinity	pH	Fe	Oxygen Consumed	No. of Samples
				Free	Total Albuminoid								
Great Barrington (Housatonic Water Works Co.)	Long Pond	7	82	.005	.125	.05	1.3	71	62	–	.08	–	6
Great Barrington (Fire District)	East Mountain Reservoir	13	53	.018	.068	.04	1.4	41	35	–	.10	–	4
Groveland	Haverhill Water Supply												
Hadley (Water Supply District)	Hart's Brook Reservoir	11	45	.002	.033	.07	1.7	25	18	–	.08	–	3
Hanson	Brockton Water Supply												
Hatfield	Running Gutter Brook Reservoir	11	68	.007	.036	.92	1.9	30	20	–	.15	–	3
Haverhill	Millvale Reservoir	86	57	.057	.180	.09	3.9	26	17	–	1.35	9.1	11
	Johnson's Pond	19	54	.012	.172	.07	4.5	28	20	–	.14	–	11
	Crystal Lake	15	38	.008	.142	.09	3.6	16	11	–	.14	–	11
	Pentucket Lake	9	44	.009	.154	.06	4.0	22	15	–	.08	–	11
	Kenoza Lake	16	47	.007	.126	.06	4.2	25	17	–	.10	–	11
Hingham (Water Co.)	Accord Pond	29	48	.030	.130	.07	7.0	11	7	–	.14	–	10
Hinsdale (Fire District)	Reservoir	5	25	.004	.039	.05	1.2	7	3	–	.32	–	3
Holbrook	Joint supply with Randolph												
Holden	Rutland Water Supply												
Holyoke	Hugh McLean Reservoir	11	37	.006	.121	.06	1.4	20	12	–	.10	–	11
	Carmody Reservoir	30	40	.009	.129	.09	1.4	14	10	–	.14	5.8	11
	Wright and Ashley ponds	10	45	.006	.109	.06	1.4	26	21	–	.07	–	11
	White Reservoir	18	33	.010	.105	.07	1.3	16	10	–	.13	–	11
	Whiting Street Reservoir	8	51	.006	.116	.06	1.5	29	24	–	.07	–	11
Hopedale	Milford Water Supply												
Hudson	Gates Pond	9	34	.012	.102	.07	2.5	17	8	–	.11	–	6
Hull	Hingham Water Supply												
Huntington (Fire District)	Cold Brook Reservoir	16	31	.004	.032	.06	1.4	12	8	–	.13	–	6
Ipswich	Dow's Brook Reservoir	28	53	.016	.162	.08	6.9	24	14	–	.13	–	4
	Bull Brook Reservoir	94	68	.022	.249	.11	7.6	29	20	–	.17	14	4
Lancaster	Clinton Water Supply												
Lawrence	Merrimack River	39	61	.144	.249	.169	3.1	12	7	6.4	.46	6.3	51
	Merrimack River, filtered	32	53	.047	.130	.304	5.5	15	7	6.3	.55	3.8	12
Lee (Berkshire Water Co.)	Codding Brook Upper Reservoir	6	42	.006	.035	.04	1.1	24	17	–	.08	–	4
	Codding Brook Lower Reservoir	6	40	.003	.041	.05	1.2	22	16	–	.09	–	4
	Basin Pond Brook	47	40	.003	.105	.05	1.1	13	7	–	.10	9.9	4
Lenox (Water Co.)	Lower Root Reservoir	7	72	.017	.084	.06	1.3	57	56	–	.15	–	4
	Woolsey Reservoir	7	59	.022	.082	.06	1.2	37	37	–	.11	–	4
Leominster	Fall Brook Reservoir	15	27	.012	.089	.06	1.9	6	3	–	.12	–	5
	Haynes Reservoir	12	32	.028	.140	.06	1.6	8	4	–	.11	–	5
	Morse Reservoir	16	25	.010	.079	.05	1.7	6	3	–	.10	–	5
	No-Town Reservoir	30	33	.022	.126	.07	1.6	8	3	–	.13	–	5

LEOMINSTER	No-Town Reservoir and Simonds Pond, raw water	30	33	.014	.116	.06	1.5	8	4	5.9	.26	–	6
	No-Town Reservoir and Simonds Pond, filtered	5	47	.017	.044	.08	1.7	25	9	7.4	.07	–	6
Lexington	Metropolitan Water Supply												
Lincoln	Sandy Pond	5	27	.007	.094	.08	3.2	11	4	–	.10	–	3
Longmeadow	Springfield Water Supply												
Ludlow	Ludlow Supply of Springfield Water Supply												
LYNN	Birch Pond	8	50	.014	.168	.09	7.6	23	12	–	.11	–	10
	Breeds Pond	27	63	.024	.169	.08	7.7	29	15	–	.24	–	10
	Hawkes Pond	72	81	.026	.259	.09	7.6	39	23	–	.27	11.0	10
	Walden Pond	50	66	.017	.194	.09	7.8	31	18	–	.28	7.8	10
Lynnfield (Water District)	Lynn Water Supply												
MALDEN	Metropolitan Water Supply												
Manchester	Gravel Pond	13	45	.004	.091	.16	8.4	12	10	6.8	.20	–	12
MARLBOROUGH	Lake Williams	16	59	.017	.196	.06	6.3	27	20	–	.48	–	4
	Millham Brook Reservoir	30	56	.016	.194	.21	5.2	20	10	–	.40	–	4
Maynard	White Pond	4	28	.012	.097	.06	2.5	9	7	–	.06	–	5
MEDFORD	Metropolitan Water Supply												
MELROSE	Metropolitan Water Supply												
Middleton	Joint supply with Danvers												
Milford (Water Co.)	Charles River, inlet to filters	50	45	.022	.146	.13	2.9	14	7	6.2	.36	7.6	4
	Dug Wells and Charles River, filtered	20	56	.006	.052	.16	3.3	28	22	7.1	.19	–	4
Milton	Metropolitan Water Supply												
Monroe (Water District)	Phelps Brook Reservoir	24	32	.013	.080	.07	1.2	15	10	–	.29	–	4
Montague (Turners Falls Fire District)	Lake Pleasant	7	33	.017	.078	.06	1.6	11	5	–	.09	–	4
Monterey (Water Co.)	Reservoir	15	91	.002	.033	.06	1.5	68	60	–	.10	–	4
Nahant	Metropolitan Water Supply												
NEW BEDFORD	Great Quittacas Pond	45	40	.012	.151	.07	5.3	10	6	–	.13	8.2	10
	Little Quittacas Pond	29	39	.017	.152	.07	5.4	10	6	–	.17	–	20
NEWBURYPORT	Artichoke River	36	*67	.031	.287	.07	5.5	28	–	–	.41	6.1	7
	Collecting Basin	12	*64	.006	.117	.30	6.2	29	–	–	.25	2.6	7
	Mixed raw water	13	*62	.007	.088	.28	6.0	28	22	6.8	.27	2.6	7
	Ground and Reservoir water, filtered	6	63	.005	.051	.42	6.2	28	22	6.8	.07	–	7
NORTH ADAMS	Broad Brook	14	34	.005	.043	.14	1.2	14	7	–	.05	–	6
	Notch Brook Reservoir	8	63	.048	.041	.07	1.0	50	41	–	.08	–	6
	Mount Williams Reservoir	3	70	.006	.047	.07	1.0	59	52	–	.07	–	6
NORTHAMPTON	Middle Reservoir (Roberts Meadow Brook)	28	41	.007	.094	.07	1.4	21	14	–	.22	–	6
	Mountain Street Reservoir	11	37	.005	.057	.05	1.3	21	14	–	.06	–	6
North Andover	Great Pond	15	46	.022	.159	.06	4.4	21	9	–	.25	–	4
Northborough	Lower Reservoir (Cold Harbor Brook)	72	45	.011	.169	.12	2.4	12	13	6.8	.37	10.0	6
North Brookfield	Doane Pond	34	35	.055	.227	.07	1.8	13	9	–	.52	4.9	6
	North Pond	32	33	.078	.260	.08	1.9	10	7	–	.20	5.8	6
Northfield (Water Co.)	Minot Brook Reservoir	17	33	.003	.047	.07	1.3	14	11	–	.07	–	3
Northfield (Northfield Schools, Inc.)	Upper Reservoir on Louisiana Brook	17	38	.023	.069	.07	1.2	17	13	6.7	.47	–	3
	Lower Reservoir on Louisiana Brook	17	37	.014	.061	.06	1.2	21	13	6.9	.42	–	3
Norwood	Buckmaster Pond, filtered	6	50	.011	.049	.37	5.7	23	10	6.5	.41	–	12

*Unfiltered.

Averages of Chemical Analyses of Surface-Water Sources, etc.—Continued

[Parts per Million]

City or Town	Source	Color	Residue on Evaporation	Ammonia		Nitrogen as Nitrates	Chlorides	Hardness	Alkalinity	pH	Fe	Oxygen Consumed	No. of Samples
				Free	Total Albuminoid								
Orange	Coolidge Brook Reservoir	20	33	.016	.094	.09	1.7	9	8	–	.11	–	3
Palmer (Fire District No. 1)	Graves Brook, Lower Reservoir	13	38	.011	.051	.06	1.8	12	11	–	.38	–	5
Peabody	Spring Pond	16	59	.039	.157	.07	8.0	23	14	–	.17	–	6
	Suntaug Lake	50	65	.043	.220	.09	8.0	22	13	–	.24	8.5	6
Pembroke	Brockton Water Supply												
Pittsfield	Sackett Reservoir	9	70	.004	.042	.08	1.2	59	50	–	.15	–	6
	Hathaway Reservoir	7	86	.013	.032	.08	1.3	76	65	–	.10	–	6
	Ashley Reservoir	11	64	.015	.072	.06	1.3	26	38	–	.08	–	6
	Ashley Lake	12	52	.012	.089	.07	1.2	39	30	–	.09	–	6
	Farnham Reservoir	30	39	.020	.187	.08	1.3	16	6	–	.23	–	6
	Mill Brook Reservoir	20	42	.007	.098	.08	1.2	23	16	–	.12	–	6
	Sand Wash Brook Reservoir	74	51	.079	.212	.12	1.3	16	8	–	.25	11.8	4
Plainville	North Attleborough Water Supply												
Plymouth	Little South Pond	2	25	.010	.120	.05	6.8	5	4	–	.06	–	4
	Great South Pond	2	26	.010	.095	.07	6.6	5	4	–	.06	–	4
Quincy	Metropolitan Water Supply												
Randolph	Great Pond	30	63	.028	.169	.16	7.5	20	14	6.8	.15	–	4
Revere	Great Pond, filtered	11	77	.018	.085	.26	9.0	21	16	6.8	.11	–	6
	Metropolitan Water Supply												
Rockland	Joint supply with Abington												
Rockport	Cape Pond	44	81	.048	.264	.08	23.5	17	11	–	1.18	7.9	11
Russell	Black Brook Reservoir	26	43	.010	.069	.07	1.5	14	11	–	.24	–	5
Rutland	Muschopauge Lake	5	34	.041	.173	.05	3.4	13	6	–	.12	–	4
Salem	Ipswich River at Pumping Sta.	32	*147	.084	.269	.88	9.6	68	–	–	1.22	6.2	5
	Longham Reservoir	88	75	.048	.261	.21	9.5	24	12	–	.69	11.2	10
	Wenham Lake	36	72	.046	.181	.18	9.1	30	17	6.8	.21	6.6	10
	Wenham Lake, filtered	4	83	.064	.065	.20	9.3	41	20	7.4	.07	–	10
Saugus	Lynn Water Supply												
Shelburne (Shelburne Falls Fire District)	Fox Brook Reservoir	8	59	.001	.032	.11	1.1	36	29	–	.10	–	3
Somerville	Metropolitan Water Supply												
Southborough	Sudbury Reservoir	21	38	.009	.091	.09	3.5	17	8	–	.10	–	10
Southbridge	Hatchet Brook Reservoir No. 3	17	28	.014	.094	.07	2.0	10	5	–	.22	–	5
	Hatchet Brook Reservoir No. 4	16	25	.015	.118	.07	2.0	9	5	–	.21	–	5
South Hadley (South Hadley Falls Fire District No. 1)	Buttery Brook Reservoir	14	48	.012	.086	.37	3.3	20	10	–	.57	–	6
	Leaping Well Reservoir	7	36	.010	.053	.06	1.8	12	9	–	.11	–	6
Southwick	Springfield Water Supply												
Spencer	Shaw Pond	9	23	.009	.099	.07	1.9	8	6	–	.20	–	6

Springfield	Cobble Mountain Reservoir	17	32	.010	.100	.07	1.3	11	6	–	.27	–	10
	Cobble Mountain Reservoir, filtered	10	33	.001	.044	.09	1.3	12	7	6.3	.09	–	10
	Ludlow Reservoir	15	34	.013	.126	.06	1.7	13	8	6.7	.14	–	8
	Ludlow Reservoir, filtered	13	32	.002	.076	.32	1.7	14	8	6.6	.07	–	5
Stockbridge (Water Co.)	Lake Averic	11	65	.006	.124	.06	1.2	50	46	–	.09	–	5
Stoneham	Metropolitan Water Supply												
Stoughton	Muddy Pond	38	47	.005	.047	.07	3.9	12	8	–	.11	–	3
Sunderland (Water Co.)	Saw Mill Brook Reservoir	6	70	.001	.017	.08	1.6	41	44	–	.09	–	4
Swampscott	Metropolitan Water Supply												
Taunton	Assawompsett Pond	32	34	.028	.168	.09	5.2	8	6	–	.27	7.1	9
	Elder's Pond	13	32	.024	.127	.07	5.2	8	5	–	.06	–	9
Wakefield	Crystal Lake	14	72	.041	.175	.27	8.4	31	20	7.0	.18	–	12
	Crystal Lake, filtered	11	69	.004	.085	.43	8.5	31	21	6.7	.06	–	12
Wareham (Onset Fire District)	Jonathan Pond	3	26	.015	.073	.05	6.0	7	4	–	.06	–	6
Watertown	Metropolitan Water Supply												
West Bridgewater	Brockton Water Supply												
Westfield	Montgomery Reservoir	42	35	.027	.144	.07	1.6	7	6	–	.14	7.1	4
	Winchell Reservoir	10	28	.009	.062	.06	1.6	8	6	–	.11	–	4
	Granville Reservoir	10	27	.014	.056	.05	1.5	7	6	–	.18	–	11
Westhampton (Water Co.)	Reservoir	6	40	.003	.059	.05	1.3	20	13	–	.25	–	3
West Newbury	Haverhill Water Supply (Johnson's Pond)												
West Springfield	Bear Hole Brook Reservoir	12	75	.019	.061	.06	1.7	45	38	7.1	.19	–	4
	Bear Hole Brook Reservoir, filtered	8	71	.002	.024	.07	1.6	46	37	7.1	.06	–	4
West Stockbridge (East Mountain Water Co.)	East Mountain Reservoir	2	55	.005	.025	.06	1.5	33	23	–	.08	–	3
Weymouth	Great Pond	65	42	.012	.148	.10	5.6	11	4	5.5	.40	–	6
	Great Pond, filtered	7	62	.008	.049	.14	5.6	18	16	7.8	.06	–	6
Whitman	Brockton Water Supply												
Wilbraham	Ludlow Supply of Springfield Water Supply												
Williamsburg	Unquomonk Brook Reservoir	20	46	.003	.065	.10	1.2	22	18	–	.12	–	3
Williamstown (Water Co.)	Paul Brook	4	52	.003	.039	.11	1.1	36	33	–	.06	–	3
	Cold Spring	1	131	.001	.009	.43	1.0	134	124	–	.05	–	3
	Sherman Spring	1	116	.003	.013	.27	1.1	93	93	–	.07	–	3
	Rattlesnake Brook Reservoir	10	88	.003	.027	.07	1.1	79	73	–	.05	–	3
Winchester	North Reservoir	8	41	.008	.134	.07	4.5	23	8	–	.08	–	5
	Middle Reservoir	11	34	.019	.154	.07	4.2	17	6	–	.19	–	5
	South Reservoir	7	37	.006	.102	.06	4.2	22	8	–	.10	–	5
Winthrop	Metropolitan Water Supply												
Worcester	Pine Hill Reservoir	14	32	.034	.126	.07	2.2	13	7	–	.13	–	6
	Upper Holden Reservoir	12	27	.004	.098	.08	2.1	10	6	–	.10	–	6
	Lower Holden Reservoir	11	26	.004	.091	.06	2.1	13	7	–	.12	–	6
	Leicester Reservoir (Lynde Reservoir)	16	36	.010	.117	.07	2.2	14	7	–	.09	–	6
	Bottomly Reservoir (Kettle Brook No. 4)	33	44	.015	.221	.30	2.4	–	–	–	.15	–	4
	Kent Reservoir (Kettle Brook No. 1)	20	36	.012	.125	.08	2.0	17	8	–	.09		4
	Mann Reservoir (Kettle Brook No. 2)	22	38	.008	.111	.08	1.9	16	7	–	.12	–	4
	Kendall Reservoir	8	27	.010	.093	.07	1.9	12	6	–	.12	–	4
	Quinapoxet Pond	29	31	.008	.111	.06	1.6	–	–	–	.10	–	6

*Unfiltered.

Averages of Chemical Analyses of Ground-Water Sources for the Year 1937

[Parts per Million]

City or Town	Source	Color	Residue on Evaporation	Ammonia		Nitrogen as		Chlorides	Hardness	Alkalinity	pH	Fe	Mn	No. of Samples
				Free	Albuminoid	Nitrates	Nitrites							
Acton (West and South Water Supply District)	Tubular wells	2	97	.001	.010	.98	.000	7.3	44	20	–	.05	.00	5
Amesbury	Tubular wells	9	137	.098	.062	.07	.000	4.6	62	43	–	8.2	.47	4
	Tubular wells, filtered	14	114	.003	.024	.09	.000	4.6	60	35	–	.19	.00	4
Ashland	New Tubular wells	5	56	.009	.017	.15	.000	4.0	25	19	–	.11	–	6
Attleboro	Dug wells and filtered water (South Attleboro)	5	55	.003	.050	.23	.000	4.4	33	23	7.7	.07	–	5
	Gravel packed wells (West Mansfield)	12	53	.002	.040	.12	.000	4.5	26	24	–	.79	.03	9
Auburn (Water Co.)	Tubular wells	0	111	.002	.015	1.3	.000	9.0	61	41	–	.05	–	3
Avon	Dug well	1	77	.004	.019	2.2	.000	5.8	32	8	–	.05	.00	5
Ayer	Dug well	2	83	.003	.008	2.3	.000	9.2	37	15	–	.09	–	9
	Tubular wells	4	67	.006	.010	.18	.000	4.9	40	35	–	.57	–	9
Barnstable (Water Co.)	Tubular wells (old supply)	1	42	.009	.005	.10	.000	11.5	11	6	–	.15	–	3
(Fire District)	Tap in Town (supplied from Yarmouth)	4	45	.000	.005	.11	.000	13.5	9	7	–	.13	–	3
(Cotuit)	Tap in Pumping Station	2	33	.002	.016	.13	.000	9.2	8	5	–	.17	–	12
Bedford	Dug well	6	39	.000	.016	.11	.001	3.9	13	9	–	.06	.01	4
	Tubular wells	4	54	.001	.013	.14	.000	4.5	20	13	–	.66	.01	4
Belchertown (Water District)	Tubular wells	1	69	.003	.005	.85	.000	4.4	31	19	–	.06	.00	4
Billerica	Gravel-packed wells—Tap in pumping station	25	80	.081	.082	.15	.000	7.8	29	19	–	.53	.32	8
Bourne (Monument Beach)	Tubular wells	0	51	.004	.019	.42	.000	10.3	13	6	–	.07	–	3
(Pocasset Beach)	Tubular wells	0	61	.066	.024	.25	.000	8.2	15	8	–	.05	–	2
(Pocasset—North Shore)	Tubular wells	0	57	.004	.008	.37	.000	14.5	15	7	–	.06	–	2
(Sagamore—Ware Tenement Supply)	Tubular wells	1	65	.001	.015	2.3	.000	11.0	18	8	–	.10	–	3
(Sagamore—Keith Block)	Tubular wells	4	60	.002	.011	.67	.001	12.0	17	14	–	.36	–	3
(Sagamore—Knowlton Property)	Tubular wells	2	37	.003	.010	.11	.000	8.5	8	9	–	.32	–	3
(Sagamore—Savery Supply)	Tubular wells	2	44	.000	.005	.09	.000	10.5	10	10	–	.13	–	3
(Sagamore Beach)	Tubular wells	0	60	.003	.011	.25	.000	17.1	14	7	–	.12	–	2
(Sagamore Heights)	Tubular wells	1	47	.006	.010	.14	.000	14.8	15	9	–	.50	–	2
Bridgewater	Tubular wells	1	65	.003	.009	1.7	.000	5.6	19	8	–	.09	–	4
Brookline	Tubular wells and filter gallery, raw water	51	98	.074	.083	.33	.003	8.2	45	38	–	2.7	.40	9
	Tubular wells and filter gallery, filtered	15	89	.002	.044	.32	.000	8.0	41	34	–	.13	.00	9

Canton	Henry's Spring well	7	70	.002	.020	1.15	.000	8.2	26	15	–	.20	.01	4
	Ward well	15	71	.005	.050	.60	.000	6.4	28	19	–	.07	.09	4
	Springdale well	10	68	.000	.031	.48	.000	5.8	26	18	–	.15	.03	4
Chatham (Water Co.)	Tubular wells	0	46	.003	.010	.09	.000	12.2	8	5	–	.05	–	4
Chelmsford (North Chelmsford Fire District)	Tubular wells	15	54	.117	.054	.20	.000	4.0	22	17	–	.34	.30	5
Chelmsford (Water District)	Tubular wells	2	81	.008	.021	1.10	.014	5.7	34	20	–	.24	.10	4
Cohasset (Water Co.)	Beechwood Filter Plant (raw water)	86	76	.052	.140	.10	.000	11.1	26	13	5.8	1.12	.15	5
	Filtered water	7	93	.036	.074	.15	.000	11.1	31	14	6.0	.10	–	3
Colrain (Griswoldville)	Deep tubular well	2	85	.000	.016	.40	.000	2.8	54	46	–	.05	–	1
Colrain (Lyonsville)	Spring	2	69	.004	.013	.07	.000	1.0	40	33	–	.35	–	2
	Deep tubular well	1	126	.003	.005	.07	.000	1.7	81	79	–	.05	–	2
Cummington	Springs	1	37	.007	.027	.85	.000	2.4	21	11	–	.06	–	2
Dedham (Water Co.)	Dug and tubular wells	12	95	.025	.047	.85	.000	10.0	43	27	–	.18	.52	6
Deerfield (Fire District)	North Springs	1	59	.006	.008	.10	.000	1.8	29	23	–	.05	–	4
	South Springs	2	46	.004	.008	.31	.000	1.9	27	13	–	.05	–	4
Douglas	Tubular wells	0	47	.000	.015	.59	.000	3.7	23	15	–	.06	.00	4
Dover	Tubular wells	2	95	.001	.008	.51	.000	8.3	43	34	–	.09	–	3
Dracut (Water Supply District)	Tubular wells, Dracut	12	129	.004	.025	2.3	.000	8.5	58	37	–	.14	–	4
	Tubular wells, Collinsville	15	102	.033	.042	.22	.002	4.3	49	47	–	.24	–	4
Dudley	Tubular wells	2	37	.001	.007	.17	.000	2.8	14	12	–	.08	–	3
Dunstable	Tubular wells	1	64	.006	.008	1.2	.000	3.2	27	14	–	.12	.01	3
Duxbury (Fire and Water District)	Tubular wells	0	46	.000	.007	.10	.001	10.3	13	10	–	.08	–	3
East Brookfield	Well	1	28	.002	.007	.13	.000	2.9	9	8	–	.07	–	3
Easthampton	Tubular wells	1	76	.001	.005	.33	.000	2.6	44	44	–	.05	–	3
Easton (North Easton Village District)	Dug well	1	58	.001	.019	.87	.000	5.6	27	10	–	.05	–	6
Easton (Unionville Fire and Water District)	North Easton Village District Water Supply													
Edgartown (Water Co.)	Dug and tubular wells	0	34	.001	.008	.08	.000	9.4	7	4	–	.06	.00	12
Fairhaven (Water Co.)	Tubular wells near Nasketucket River	33	76	.006	.074	.50	.000	9.9	30	12	–	.14	.02	6
	Tubular wells near Mattapoisett River	0	66	.002	.009	.85	.000	10.1	26	10	–	.06	.00	6
Foxborough	Tubular wells	1	51	.000	.013	.87	.000	4.6	25	16	–	.25	–	3
Framingham	North Filter Gallery	5	132	.122	.041	.18	.000	18.3	60	45	–	.22	–	5
	South Filter Gallery	1	130	.382	.074	.13	.001	20.3	61	43	–	.07	–	5
Franklin	Tubular wells	2	50	.007	.016	.11	.000	4.9	21	16	–	.32	–	3
Georgetown	Tubular wells (raw water)	5	65	.001	.011	.18	.000	4.7	28	18	–	2.26	.04	11
	Tubular wells, filtered	2	60	.001	.009	.17	.000	4.6	28	20	–	.23	.02	11
	Tap in town	2	62	.001	.009	.18	.000	4.6	28	19	–	.18	.02	11
Gill (Riverside Water Co.)	Spring	1	75	.004	.018	.65	.000	2.3	35	24	–	.10	–	2
Grafton (Water Co.)	Gravel-packed well at North Grafton	5	–	.000	.024	.50	.000	5.8	31	–	–	.05	–	1
	Dug wells at Grafton	3	121	.001	.018	2.8	.000	11.3	46	23	–	.06	–	4
Granville (Water Co.)	Well and springs	2	28	.003	.023	.10	.000	1.6	11	11	–	.11	–	3
Great Barrington (Fire District)	New infiltration gallery near Green River	0	105	.008	.019	.21	.000	1.4	98	92	7.1	.04	–	4

Averages of Chemical Analyses of Ground-Water Sources, etc.—Continued

[Parts per Million]

City or Town	Source	Color	Residue on Evaporation	Ammonia		Nitrogen as		Chlorides	Hardness	Alkalinity	pH	Fe	Mn	No. of Samples
				Free	Albuminoid	Nitrates	Nitrites							
Greenfield	Dug well near Green River	4	69	.001	.021	.10	.000	1.3	46	45	–	.12	–	3
	Filter plant, raw water	8	57	.022	.051	.09	–	1.6	34	29	7.0	.11	.05	12
	Filter plant, outlet of filters	2	54	.002	.018	.14	–	1.5	35	29	7.0	.08	.00	12
Groton (Water Co.)	Dug well	1	67	.041	.020	.11	.000	2.6	40	39	–	.06	–	3
Groton (West Groton Water Supply District)	Tubular wells	0	48	.002	.006	.49	.000	2.6	31	24	–	.08	.00	6
Hanover	Tubular wells	2	63	.002	.009	.17	.000	7.3	27	18	–	.16	–	6
Hardwick (Center)	Dug well	1	51	.003	.013	.26	.000	1.5	25	22	–	.67	–	3
Hardwick (Gilbertville)	Dug and tubular wells	2	57	.003	.007	.11	.001	1.5	33	24	–	.08	–	3
Hardwick (Wheelwright)	Tubular wells	0	44	.002	.028	.10	.000	3.0	17	11	–	.30	–	1
Harwich	Tubular wells (gravel-packed)	1	49	.002	.008	.19	.000	12.8	11	5	–	.07	–	6
Hingham (Water Co.)	Filter galleries	24	79	.003	.053	.22	.000	7.2	35	31	7.3	.13	.02	10
Holliston (Water Co.)	Large well	31	49	.006	.094	.11	.000	4.3	20	10	–	.64	.02	9
Hopedale	Milford Water Supply													
Hopkinton	Tubular wells	1	61	.003	.004	.73	.000	3.5	28	18	–	.08	–	3
Hull	Hingham Water Supply													
Kingston	Tubular wells	1	46	.002	.006	.09	.000	7.5	12	11	–	.05	–	4
Leicester (Water Supply District)	Dug wells	8	67	.002	.022	1.3	.000	3.3	30	20	–	.08	–	3
Leicester (Cherry Valley and Rochdale Water District)	Dug wells	16	56	.023	.068	.08	.000	2.9	25	19	–	.14	–	3
Littleton	Tubular wells	0	39	.001	.007	.19	.000	2.6	23	12	–	.06	–	3
Lowell	Boulevard wells, raw water	42	62	.102	.044	.24	.000	3.8	27	22	–	2.5	.54	10
	Effluent of sand filter	13	52	.002	.028	.25	.000	3.7	25	17	–	.24	.00	10
Manchester	Dug and tubular wells	4	117	.001	.013	.52	.000	15.3	40	44	–	.17	.02	12
Mansfield	Dug well	0	43	.000	.006	.29	.003	3.7	17	8	–	.08	.01	6
Marblehead	Tubular wells	41	228	.103	.151	.19	.003	10.9	127	87	–	.24	.45	6
	Dug well	8	190	.031	.041	.18	.000	17.5	89	38	–	1.05	.14	6
	Dug and tubular wells, filtered	9	204	.007	.037	.31	.000	21.4	103	56	–	.13	.00	6
Marion	Old tubular wells	0	48	.001	.012	.28	.000	7.5	17	8	–	.07	–	4
	New tubular wells	0	–	.001	.004	.30	.000	20.4	40	–	–	.10	–	2
Marshfield	Tubular wells	3	41	.002	.007	.11	.000	8.3	9	11	–	.09	–	6
Marshfield (Humarock Beach Supply)	Tubular wells	1	93	.001	.009	.30	.000	21.7	24	12	–	.80	–	2
Mattapoisett	Tubular wells	3	57	.003	.008	.20	.000	7.9	23	16	–	.40	.11	2
Medfield	Tubular wells, tap in town (supplied from State Hospital)	1	69	.002	.010	.15	.000	3.9	34	30	–	.09	.01	4
Medway	Tubular wells	1	81	.044	.013	.70	.000	9.6	37	29	–	.18	–	6
Merrimac	Tubular wells	0	78	.007	.014	.23	.000	6.2	35	15	–	.07	.27	4

Methuen	Gravel-packed well	21	87	.044	.044	.63	.001	7.7	39	27	–	.80	–	6
	Lone Tree Hill wells	8	82	.277	.038	.44	.000	6.1	40	35	–	.32	–	9
Middleborough	Dug well	9	75	.129	.056	.56	.000	6.8	31	13	–	3.4	.80	5
	Final effluent (dug well filtered)	15	69	.002	.018	.51	.000	7.0	29	17	–	.46	.00	5
Millbury (Water Co.)	Dug well	3	43	.000	.019	.40	.000	3.4	26	11	–	.04	–	2
Millis	Dug wells	0	143	.004	.010	3.3	.000	10.2	62	34	–	.10	–	4
Monson	Old dug well	22	41	.001	.032	.11	.000	1.8	9	11	–	.06	–	4
	New dug well	1	30	.004	.016	.07	.000	1.8	10	10	–	.04	–	4
Montague (Montague Village)	Springs	4	43	.000	.017	.11	.000	1.7	28	19	–	.09	–	3
Nantucket (Wannacomet Water Co.)	Wells at Wyers Valley	0	60	.001	.008	.13	.000	17.7	19	12	–	.07	–	5
Nantucket (Siasconset)	Dug wells	1	60	.001	.016	.17	.000	17.2	22	13	–	.05	–	3
Natick	Dug well	1	120	.003	.013	.53	.000	10.1	59	45	–	.05	–	6
Needham	Dug well No. 1	0	93	.003	.015	2.8	.000	7.6	41	14	–	.08	–	6
	Dug well No. 2	1	94	.004	.013	2.7	.000	7.2	38	16	–	.09	–	6
	Tubular wells (Great Plain Avenue)	2	106	.004	.019	1.5	.000	7.8	38	40	–	.10	–	6
	Charles River St. Pump Sta. (Gravel-packed well)	0	120	.000	.004	1.9	.000	7.3	70	54	–	.67	–	6
Newton	Tap in pumping station (treated water)	4	116	.006	.027	.33	.000	8.0	32	74	7.3	.14	.13	12
	Dug well No. 1	1	80	.001	.017	.33	.000	6.9	39	31	–	.07	.00	12
	Dug well No. 2	2	76	.002	.025	.25	.000	7.2	38	31	–	.05	.00	12
North Attleborough	Dug wells	6	58	.005	.015	.42	.001	5.4	28	15	–	.26	–	4
Northbridge	Tubular wells (Meadow Pond)	0	38	.002	.017	.13	.000	3.4	16	9	–	.05	–	4
	Tubular wells (Cook Allen)	6	37	.002	.054	.07	.000	2.0	9	5	–	1.3	–	4
North Reading	Tap in town (supplied from Wilmington)	2	70	.001	.010	.40	.000	5.0	31	23	–	.08	–	10
Norton	Tubular wells	0	55	.003	.009	.09	.000	3.5	18	14	–	.13	–	3
Norwood	Tubular wells	5	92	.006	.035	.70	.000	8.2	42	24	–	.17	.08	11
	Tubular wells, filtered	3	104	.002	.013	.67	.001	8.7	43	26	–	.14	.01	11
Oak Bluffs (Cottage City Water Co.)	Springs	1	42	.001	.009	.15	.000	8.9	15	11	–	.16	–	3
Orange	Crystal Spring	7	32	.000	.013	.09	–	1.9	11	9	–	.09	–	3
Oxford (Water Co.)	Tubular wells	0	57	.002	.011	.97	.000	3.5	26	17	–	.05	–	3
Palmer (Bondsville Water Co.)	Tubular wells	1	64	.002	.012	.47	.000	3.2	33	19	–	.08	–	3
(Thorndike)	Hamilton Reservoir	10	41	.006	.037	.06	–	2.1	15	16	–	.08	–	4
(Three Rivers)	Collecting wells	3	44	.002	.010	.11	.000	2.1	15	15	–	.05	–	2
	Tubular wells	1	46	.004	.005	.80	.000	5.5	24	10	–	.32	–	2
Paxton	Spring	3	28	.000	.008	.10	.000	1.9	12	12	–	.13	–	10
Pepperell	Tubular wells	0	34	.003	.008	.06	.000	1.8	16	12	–	.05	–	3
Provincetown	Tubular wells	0	140	.006	.006	.13	.002	72.5	40	9	–	.06	–	6
Reading	New Tubular wells	6	91	.008	.013	.33	.000	6.6	44	27	–	.88	.10	6
Rockport	Tubular wells	2	71	.001	.014	.33	.000	16.1	23	10	–	.07	–	3
Salisbury (Water Supply Co.)	Old dug well	12	62	.002	.030	.20	.003	5.7	23	23	–	.20	–	1
	New dug well	10	93	.002	.013	.07	.000	6.9	52	49	–	.92	–	6
Scituate	Webster Meadow wells	1	97	.000	.007	.72	.000	13.8	40	28	–	.08	–	4
	Beaver Dam wells	1	139	.004	.015	1.8	.000	25.5	54	26	–	.14	–	3
	Kent Street wells	1	182	.005	.019	.70	.000	52.0	52	17	–	.07	–	2
Sharon	Dug well	1	188	.003	.007	4.1	.000	34.4	87	49	–	.08	–	4
	Tubular wells	5	68	.003	.010	.85	.000	6.5	29	21	–	.21	–	4

Averages of Chemical Analyses of Ground-Water Sources, etc.—Continued

[Parts per Million]

City or Town	Source	Color	Residue on Evaporation	Ammonia		Nitrogen as		Chlorides	Hardness	Alkalinity	pH	Fe	Mn	No. of Samples
				Free	Albuminoid	Nitrates	Nitrites							
Sheffield (Water Co.)	Smith Spring	1	38	.007	.019	.09	.000	1.4	20	20	–	.06	–	3
	Farm House Spring	1	45	.001	.013	.18	.000	1.3	23	21	–	.12	–	3
	Red Rock Spring	1	34	.000	.010	.12	.000	1.2	19	18	–	.05	–	3
Shirley (Shirley Village Water District)	Dug wells	0	77	.000	.006	2.3	.000	7.6	29	11	–	.08	–	3
	Collecting wells	3	44	.002	.010	.11	.000	2.1	15	15	–	.05	–	2
Shrewsbury	Gravel-packed wells (South Street)	2	–	.001	.015	.80	.000	3.8	24	14	–	.07	–	3
	Gravel-packed wells (Oak Street)	1	56	.001	.009	.23	.000	4.0	26	17	–	.05	–	3
Somerset	Tubular wells	24	120	.005	.035	.21	.000	6.8	31	55	–	.60	–	6
South Hadley (Fire District No. 2)	Dug wells	1	56	.001	.007	.31	.000	2.2	27	19	–	.05	–	3
	Elmer Brook	7	67	.009	.036	.07	–	1.9	40	31	7.1	.09	–	3
	Elmer Brook, filtered	2	66	.005	.024	.12	–	2.1	37	31	7.0	.05	–	3
Stockbridge (Hill Water Co.)	Springs	2	67	.000	.006	.07	.000	1.4	52	47	–	.08	–	3
Sterling	Tubular wells	2	88	.002	.012	.35	.000	3.5	51	51	–	.16	–	12
Sturbridge	Tubular wells	4	58	.002	.005	.18	.000	6.4	27	17	–	.89	.02	9
Sudbury	Tubular wells	0	55	.001	.004	.24	.000	3.9	30	26	–	.08	–	6
Sutton (Water Co.)	Dug and tubular wells	1	108	.001	.007	.70	.000	5.0	52	38	–	.10	–	3
Tisbury	Tashmoo Spring	1	45	.001	.007	.09	.000	10.9	9	8	–	.07	–	7
Townsend	Tubular wells	1	28	.001	.009	.15	.000	2.2	9	7	–	.05	–	12
Upton (West Upton)	Tubular wells	0	84	.001	.007	.91	.000	6.3	35	13	–	.05	–	7
Uxbridge	Tubular wells (new system)	1	61	.001	.007	1.07	.001	5.7	24	16	–	.04	–	3
Walpole	Tubular wells	1	56	.001	.017	.60	.000	4.6	24	17	–	.05	–	3
Waltham	Old dug well	8	100	.032	.022	.16	.000	10.0	45	38	–	1.02	.18	11
	New dug well	2	77	.003	.015	.41	.000	6.8	38	23	–	.05	.00	11
Ware	Large well, treated	0	104	.003	.012	1.3	.000	4.9	31	44	6.8	.05	.00	6
Wareham (Wareham Fire District)	Tubular wells	2	36	.001	.008	.11	.000	6.7	12	8	–	.11	.05	7
Warren (Warren Water District)	Tubular wells	0	34	.004	.014	.27	.000	2.7	11	10	–	.05	.01	5
Warren (West Warren Water Co.)	Dug wells	15	50	.005	.025	.19	.000	2.3	22	12	–	.12	.00	3
Wayland	Tubular wells	2	94	.006	.012	.75	.000	6.1	48	29	–	.13	–	4
Webster	Tubular wells	4	40	.006	.022	.21	.000	3.3	22	16	–	.08	–	6
Wellesley	Tubular wells at pump-station No. 1	3	86	.002	.009	.75	.000	7.7	45	27	–	.14	–	4
	Dug well at pumping station No. 2	0	94	.001	.007	.95	.000	7.6	38	35	–	.09	–	4
	Large tubular well at pumping station No. 3	4	–	.000	.007	1.0	.000	6.2	38	–	–	.12	–	3

Westborough	Filter basin	2	33	.007	.059	.06	–	2.5	12	8	–	.10	–	4
West Brookfield	Tubular wells	0	55	.001	.004	.19	.000	2.8	21	9	–	.14	–	3
Westford (Water Co.)	Tubular wells (Westford)	0	59	.005	.009	.23	.000	2.7	29	25	–	.08	–	4
Weston	Tubular wells at Warren Avenue	2	106	.000	.014	1.10	.000	7.7	54	30	–	.04	–	4
	Tubular wells at Kendal Green	0	74	.000	.010	.60	.000	5.5	32	19	–	.05	–	4
Weston (Water Co.)	Dug wells	6	89	.004	.028	.10	.000	6.2	44	25	–	.15	–	2
West Stockbridge (East Mountain Water Co.)	Johnson's Spring	1	107	.000	.013	.05	.000	1.5	80	80	–	.07	–	3
	Blake's Spring	0	150	.000	.010	.10	.000	1.4	129	126	–	.07	–	3
Westwood (Water Co.)	Dedham Water Supply													
	Tubular wells	2	85	.003	.011	1.03	.000	7.2	38	21	–	.08	–	9
Wilmington	Tubular wells	1	62	.002	.010	.36	.000	4.9	29	19	–	.06	–	10
Winchendon	Old dug well	28	52	.040	.064	.12	.000	1.6	21	13	–	3.2	–	4
	New dug well	27	35	.009	.041	.10	.000	1.5	12	6	–	.49	–	4
Woburn	Gravel-packed well A	2	120	.003	.033	.37	.008	11.4	59	50	–	.05	–	6
	Gravel-packed well A2	0	–	.023	.028	.32	.007	13.1	68	–	–	.04	–	4
	Gravel-packed well B	1	114	.025	.024	.31	.000	10.8	56	22	–	.05	–	6
	Gravel-packed well D	0	77	.003	.013	.30	.000	8.1	39	24	–	.04	–	6
	Gravel-packed well E	0	114	.003	.014	3.9	.000	10.4	53	19	–	.06	–	4
Worthington (Fire District)	Springs	2	33	.001	.034	.10	.002	1.2	13	12	–	.15	–	2
Wrentham	Large tubular wells	0	63	.002	.006	1.9	.000	4.5	25	10	–	.10	–	3
Yarmouth	Tubular wells	0	45	.001	.004	.12	.001	13.3	12	6	–	.07	–	3

Sanitary Protection of Public Water Supplies

During the year 1937 rules and regulations were adopted by the Department in accordance with Section 160 of Chapter 111 of the General Laws for the purpose of preventing pollution and securing the sanitary protection of the waters of Buttery Brook and Leaping Well reservoirs, so called, and their tributaries, used by the South Hadley Fire District No. 1 as sources of water supply.

The cities, towns, fire and water districts, and water companies, for which rules and regulations have been adopted by the Department are as follows:

Abington and Rockland	1927
Adams (Fire District)	1921
Amherst (Water Company)	1931
Andover	1908
Ashburnham	1922
Ashfield (Water Company)	1923
Athol	1934
Attleboro	1926
Braintree	1913, 1926*
Brockton	1905, 1934*
Cambridge	1899
Cheshire (Water Company)	1933
Chester (Fire District)	1914
Chicopee	1906
Clinton	1935
Cohasset (Water Company)	1923
Colrain (Fire District)	1932, 1934*
Concord	1910
Dalton (Fire District)	1919
Danvers and Middleton	1920
Deerfield (So. Deerfield Water Supply District)	1932
Easthampton	1904
Egremont (South Egremont Water Company)	1932
Fall River	1907
Falmouth	1930
Fitchburg	1903, 1907, 1918*
Gardner	1910
Gloucester	1930
Great Barrington (Housatonic Water Works Company)	1929, 1936*
Greenfield	1904
Hatfield	1934
Haverhill	1921
Hingham and Hull (Hingham Water Co.)	1912
Holden	1914, 1935*
Holyoke	1908, 1918*
Hudson	1929
Lakeville (State Sanatorium)	1926
Lee (Berkshire Water Company)	1919
Leicester (Cherry Valley and Rochdale Water District)	1914
Lenox (Water Company)	1933
Leominster	1919, 1927*
Lincoln and Concord	1903
Lynn	1907
Manchester	1934
Marlborough	1901
Maynard	1907
Medfield (State Hospital)	1922**
Metropolitan Water District	1925
Milford (Water Company)	1924
Montague (Turners Falls Fire District)	1908, 1936*
New Bedford	1932
Newburyport	1921
Norfolk (State Hospital)	1926
Northampton	1904
North Andover	1912
Northborough	1905, 1934*
North Brookfield	1935
Norwood	1901
Palmer (Fire District No. 1)	1933
Peabody	1922
Pittsfield	1903, 1909*
Plymouth	1908
Randolph and Holbrook	1926
Rockport	1902
Russell	1910
Rutland	1914, 1935*
Salem and Beverly	1901
Scituate	1927
Southbridge (Southbridge Water Supply Company)	1931
South Hadley (Fire District No. 1)	1937
Spencer	1934
Springfield	1904, 1910*
Stockbridge (Water Co.)	1910
Taunton	1932
Wakefield	1904
Westborough	1929
Westfield	1922
West Springfield	1907
Weymouth	1903, 1935*
Williamsburg	1914
Winchester	1909
Worcester	1926

Acquisition of Land for Protection of Water Supplies

During the year five applications were received for the approval of the Department for the purchase or taking of lands for the protection of sources of public

* Readopted.
** Rescinded 1936.

water supply. In all cases a hearing relative to the proposed takings was given by the Department under the provisions of Section 41 of Chapter 40 of the General Laws. These proposed acquisitions are shown in the following table:

Water Supply of City or Town	Source of Supply		Location of Land	Approximate Area of Land in Proposed Taking (Acres)
	Source	Location		
Gardner	Crystal Lake	Gardner	Gardner	1834.08±*
Greenfield	Glen Brook	Leyden	Leyden	28±
Salem-Beverly (Salem and Beverly Water Supply Board)	Wenham Lake	Wenham	Wenham	1.1±
Leicester (Cherry Valley and Rochdale Water District)	Dug Wells and Henshaw Pond	Leicester	Leicester	2.5±
Deerfield (Deerfield Fire District)	Wells and Springs	Deerfield	Deerfield	16±

* This includes some 1,400 acres taken in previous years

Consumption of Water

Records relative to water consumption received from cities and towns throughout the State show a slight decrease in the amount of water consumed in 1937 compared with that in the year 1936. The water consumption records of the Metropolitan Water District, which include records of the use of water by approximately one and one-half million persons, showed a decrease during the year 1937 of about 2% from that during the same period in the year 1936. This decrease is due to a large extent to a substantial decrease in the water consumption of the city of Boston during the months from February to June, inclusive, and again in October, November and December, which overbalanced the increase in water consumption experienced in the months of July, August and September. A decrease in water consumption in the months from February to June, inclusive, was also experienced in most of the other municipalities of the Metropolitan Water District. The decrease in water consumption during the winter months was due to a large extent to the mild winter. The only water shortage was experienced in the town of Weston where tests were made for an additional supply of water to meet the summer demands but it was not necessary to connect any additional wells to the distribution system.

The elevation of the water in the Wachusett Reservoir on December 31, 1937, was 393.79 or 1.21 feet below the spillway of the dam; this is approximately 4.5 feet higher than on the same date in 1936. The water in the reservoir was above elevation 396.00 from April 7 to July 3 and during this time there were more than 66,321.2 million gallons in storage; by November 15 this storage had been decreased 10,887.0 million gallons which is equivalent to a drawdown of 9.89 feet. There remained in storage at this time 53,434.2 million gallons but by December 31, 1937, the amount had increased to 63,345.4 million gallons.

Excessive but well distributed rainfall throughout the year on the watershed kept this reservoir well filled with a taking of only 1,011.1 million gallons of water from the Ware River. This taking was over the period from January 1 to 8, 1937, and proved unnecessary as there were some 6,000.0 million gallons wasted over the spillway during the months of April and May. No water was taken from the Quinapoxet watershed by the city of Worcester during the year but a total of 2,620.0 million gallons was received from the city of Worcester's Pine Hill Watershed.

The average daily water consumption in the various cities and towns where records are kept and submitted to this Department, the estimated population and per capita water consumption in these cities and towns are shown in the following table:

Average Daily Consumption of Water in Various Cities and Towns in 1937

City or Town	Estimated Population	Gallons	Gallons per Inhabitant
Metropolitan Water District			
Arlington	39,517	2,376,000	60
Belmont	26,064	1,391,000	53
Boston	832,323	88,145,000	106
Chelsea	42,673	3,031,000	71
Everett	47,228	4,790,000	101
Lexington	11,351	653,000	58
Malden	57,277	3,952,000	69
Medford	62,136	3,211,000	52
Melrose	24,690	1,451,000	59
Milton	18,832	1,043,000	55
Nahant	1,785	227,000	127
Quincy	78,878	4,629,000	59
Revere	35,319	2,233,000	63
Somerville	100,773	9,078,000	90
Stoneham	11,153	623,000	56
Swampscott	10,534	719,000	68
Watertown	36,193	2,092,000	58
Winthrop	17,061	1,199,000	70
Abington and Rockland	13,662	684,000	50
Acton	2,696	104,000	39
Acushnet	3,951	88,000	22
Agawam	7,250	373,000	51
Amesbury	10,514	751,000	71
Amherst	6,707	608,000	90
Andover	10,771	1,094,000	102
Ashland	2,537	306,000	121
Athol	10,780	556,000	51
Attleboro	21,861	1,280,000	59
Avon	2,362	121,000	51
Ayer	4,181	187,000	45
Barnstable	8,344	575,000	69
Bedford	3,417	186,000	54
Belchertown	4,152	28,000	7
Bernardston	1,007	10,000	10
Beverly	26,185	1,476,000	56
Billerica	6,958	336,000	48
Braintree	17,686	1,137,000	64
Bridgewater	9,260	211,000	23
Brockton	62,407	3,436,000	55
Brookfield	1,309	45,000	34
Brookline	51,450	4,730,000	92
Cambridge	119,848	12,002,000	100
Canton	6,780	561,000	83
Chatham	2,098	98,000	47
Chelmsford	7,824	259,000	33
Chicopee	41,952	3,936,000	94
Clinton	12,373	1,049,000	85
Cohasset	3,552	282,000	79
Concord	7,821	445,000	57
Danvers and Middleton	16,335	1,105,000	68
Dartmouth	9,682	272,000	28
Dedham	15,465	972,000	63
Douglas	2,486	186,000	75
Dracut	6,500	211,000	32
Dudley	4,690	177,000	38
Duxbury	2,463	258,000	105
East Bridgewater	3,701	194,000	52
Easthampton	10,486	920,000	87
East Longmeadow	3,395	112,000	33
Easton	5,294	372,000	70
Edgartown	1,448	157,000	108
Fairhaven	11,026	427,000	39
Fall River	118,270	5,938,000	50
Falmouth	7,223	851,000	118
Fitchburg	42,104	4,479,000	106
Foxborough	6,029	520,000	86
Framingham	22,827	1,363,000	60
Franklin	7,680	641,000	83
Gardner	20,797	928,000	45
Gloucester	24,164	1,752,000	73
Grafton	7,941	128,000	16
Greenfield	16,064	1,384,000	86
Groton	2,574	287,000	111
Groveland	2,219	66,000	30
Hanover	2,709	162,000	60
Hanson and Pembroke	4,182	133,000	32
Harwich	2,391	34,000	14
Haverhill	49,838	3,869,000	78
Hingham and Hull	10,477	1,477,000	141
Holden	3,931	71,000	18
Holliston	2,949	105,000	36
Holyoke	56,139	7,512,000	134
Hudson	8,506	423,000	50
Ipswich	6,464	284,000	44
Kingston	2,771	243,000	88
Lancaster	2,590	116,000	45
Lawrence	87,471	4,309,000	49
Lenox	2,706	300,000	110
Lincoln	1,605	292,000	182
Littleton	1,563	72,000	46
Longmeadow	5,372	307,000	57
Lowell	100,114	5,701,000	57
Ludlow	8,569	391,000	46
Lynn	100,909	7,425,000	74
Lynnfield	2,017	49,000	24
Manchester	2,509	281,000	112
Mansfield	6,615	565,000	85
Marblehead	10,775	749,000	70
Marion	1,959	208,000	106
Marlborough	15,859	699,000	44
Marshfield	2,252	311,000	138
Mattapoisett	1,754	109,000	62
Maynard	7,101	376,000	53
Medfield	4,200	69,000	17
Medway	3,314	230,000	69
Merrimac	2,209	215,000	97
Methuen	21,074	1,121,000	53
Middleborough	8,968	300,000	33
Milford and Hopedale	18,221	855,000	47
Millbury	6,897	516,000	75
Millis	2,242	193,000	86
Montague and Erving	9,250	797,000	86
Nantucket	3,495	578,000	165
Natick	14,716	852,000	58
Needham	12,221	672,000	55
New Bedford	110,022	9,426,000	86
Newburyport	14,815	1,383,000	93
Newton	66,491	4,723,000	71
North Adams	22,271	2,517,000	113
North Andover	7,245	480,000	66
North Attleborough	10,204	788,000	77
Northbridge	10,922	751,000	69
North Brookfield	3,255	327,000	100
Norton	3,000	132,000	44
Norwood	15,784	1,104,000	70
North Reading	2,471	32,000	13
Oak Bluffs	1,787	141,000	79
Oxford	4,371	135,000	31
Paxton	753	4,360	6
Peabody	22,377	2,915,000	130
Pepperell	3,037	300,000	99
Pittsfield	47,516	5,962,000	127
Plainville	1,615	106,000	66
Plymouth	13,239	1,212,000	92
Provincetown	4,176	398,000	95
Randolph and Holbrook	11,360	623,000	55
Reading	11,077	582,000	53
Rockport	3,635	390,000	107
Rutland	2,406	236,000	98
Salem	43,520	3,973,000	91
Salisbury	2,266	211,000	93
Saugus	15,226	795,000	52
Scituate	4,137	421,000	102
Sharon	3,816	423,000	111
Shelburne	1,631	87,000	53
Shirley	2,596	77,000	30
Shrewsbury	7,238	313,000	43
Somerset	5,759	206,000	36
Southborough	2,109	68,000	32
Southbridge	16,396	753,000	46
Southwick	1,572	26,000	16
Springfield	149,642	14,980,000	100
Sterling	1,578	13,000	8
Stockbridge	1,985	246,000	124

Average Daily Consumption of Water in Various Cities and Towns in 1937
—Concluded

City or Town	Estimated Population	Gallons	Gallons per Inhabitant	City or Town	Estimated Population	Gallons	Gallons per Inhabitant
Stoughton	8,588	564,000	66	West Brookfield	1,259	29,000	23
Sudbury	1,820	12,000	7	Westfield	18,788	2,332,000	124
Taunton	37,461	2,630,000	70	Westford	3,865	146,000	38
Tisbury	1,934	253,000	131	West Newbury	1,145	13,000	9
Townsend	2,018	74,000	37	Weston	4,054	274,000	68
Uxbridge	6,442	286,000	44	West Springfield	17,292	2,022,000	117
Wakefield	16,564	719,000	43	Weymouth	22,094	1,218,000	55
Walpole	7,519	899,000	120	Whitman	7,591	291,000	38
Waltham	41,081	2,409,000	59	Wilbraham	3,069	44,000	14
Ware	7,864	347,000	44	Wilmington	4,685	237,000	51
Wareham	6,191	555,000	90	Winchester	13,632	936,000	69
Wayland	3,510	295,000	84	Woburn	19,799	1,563,000	79
Webster	14,175	653,000	46	Worcester	190,471	15,672,000	82
Wellesley	14,151	1,194,000	84	Wrentham	4,390	157,000	36
West Bridgewater	3,416	177,000	52	Yarmouth	2,215	74,000	33

Climatological Data

The month of January, 1937, was about 8 degrees warmer throughout the State than the average; the precipitation was 1.09 inches more than the average, and the snowfall only about 6 inches or about one-half the average fall for Boston and vicinity. This excessive rainfall and high temperature following similar conditions in December, 1936, caused a runoff from the Wachusett watershed more than 5 per cent greater than any January runoff since the records were started in 1897 and filled the Wachusett Reservoir to elevation 394.56 or 0.44 of a foot below full reservoir on February 1.

The temperature in February was 5.7 degrees warmer than the average, but the precipitation was considerably below the average with a very small amount of snowfall.

During March climatological conditions for the southern New England states were the most remarkable ever known in this area; the average temperature in this State was 2.5 degrees colder than January; the precipitation was 0.37 of an inch less than the average, and the snowfall was about the average for around Boston. The runoff was about 40 per cent less than the average.

The temperature in April was 0.8 degrees colder than the average, while the precipitation, mostly in the form of rain, was well above the average. The snowfall in the vicinity of Boston averaged 1.4 inches which is about 0.8 of an inch less than the average. The excess rainfall occurred on the 22nd and the 28th.

During the month of May the temperature was 1.9 degrees warmer than the average, while the precipitation, all in the form of rain, was 0.67 of an inch in excess of the average. During the first few days of the month freezing temperatures occurred back from the coast and very excessive 24-hour rainfalls were reported on the 15th in the western section of the State. Rainfall occurred on 11 days.

The temperature during June was about the average, the first half of the month being somewhat above the normal and the latter part an equal amount below, while the rainfall was 1.02 inches in excess of the normal. Much of this precipitation occurred during the high 24-hour rainfall of the 21st. Rain occurred on 14 days and the relative humidity was slightly above the mean.

The month of July was 1.3 degrees warmer than the average, while the rainfall was 1.42 inches less than the average. This large deficiency was most acute along the coast, occurring with bright warm days. Some drought conditions of small proportions resulted in the rural districts of the coast and cape sections. The central and western sections, although receiving deficient amounts of rainfall during July, had from the previous months accumulated a considerable excess so that no public water supplies were seriously affected. There were 14 clear days in the month. The conditions in the drought section mentioned above did not improve until about the 22nd of August when very heavy rains occurred.

The temperature during the month of August was 4.9 degrees above the normal

and the rainfall, 1.48 inches in excess of the average, occurred on 11 days of the month, while 12 days were recorded as clear.

The September temperature was only 0.8 of a degree less than the normal and the rainfall, which was practically normal, was well distributed except in the northeasterly section of the State. Frost occurred in the northwestern portion of the State on the 21st of the month.

The average temperature for October was 0.9 of a degree less than the normal. Unusual cold was experienced from the 8th to the 19th with a very general killing frost on the 17th. This was followed by excessive rains, making an excess for the month of 0.98 of an inch.

The temperature for the month of November was 0.6 of a degree in excess of the normal due to an unusual mild period during the later part of the month which followed several cold days with temperatures as low as 15 degrees. The precipitation was very heavy and included an excess of 1.1 inches of snow over the average around Boston. The total precipitation was 2.35 inches in excess of the average, all of which occurred on the 13th and 28th, but no snow remained on the ground at the end of the month.

The temperature throughout the State in December was slightly less than the normal, and the precipitation was practically normal. Snowfall was recorded at Amherst on 10 days during the month, the total being 5 inches which is 4 inches less than the December normal at this station.

The monthly normal and actual mean temperatures for the vicinity of Boston for 1937 are shown in the following table:

Degrees Fahrenheit

	Normal	1937		Normal	1937
January	27.8	37.4	July	71.7	73.2
February	28.8	33.2	August	69.9	74.6
March	35.6	34.1	September	63.2	63.0
April	46.4	45.2	October	53.6	52.6
May	57.1	59.1	November	42.0	44.0
June	66.5	66.4	December	32.5	31.2

The following table has been prepared to show the monthly mean and the maximum and minimum temperature for each month in 1937 for Boston, Worcester, Amherst and Pittsfield:

Temperatures

(Degrees Fahrenheit)

1937	Boston			Worcester			Amherst			Pittsfield		
	Mean	Max.	Min.	Mean	Max.	Min.	Mean	Max.	Min.	Mean	Max.	Min.
January	37	64	15	33	63	8	32	58	9	32	61	7
February	33	56	10	31	55	6	30	55	7	28	52	4
March	34	57	15	31	56	10	31	58	12	29	53	10
April	45	71	31	44	69	23	45	71	24	45	70	26
May	59	93	42	58	89	35	59	92	35	60	90	36
June	66	95	53	66	92	46	67	92	49	67	93	48
July	73	99	55	71	96	45	72	96	50	72	95	48
August	75	98	57	73	94	48	73	95	50	74	94	50
September	63	93	45	60	90	37	60	92	36	60	92	36
October	53	74	32	49	74	23	50	76	21	49	76	22
November	44	66	23	40	65	12	40	63	14	38	61	19
December	31	50	16	28	46	6	28	48	6	26	42	4
Year	51	99	10	49	96	6	49	96	6	48	95	4
Normal	50			48			47			46		

Rainfall

The average rainfall in the State for the year ending December 31, 1937, as recorded at seven long-term stations located in different parts of the State was 47.24 inches which is 2.63 inches in excess of the normal. Deficiencies occurred during the months of February, March, July and September. The other months, all of

which show excess, provided a well-distributed water supply year. For the water or climatological year which ends September 30 there was an excess of 1.65 inches.

The following table shows the normal rainfall as deduced from the records of the seven long-term stations, each record exceeding 63 years in length, also the rainfall for the year 1937 and the excess or deficiency during each month as compared with the normal:

Month	Normal Rainfall (Inches)	Rainfall in 1937 (Inches)	Excess or Deficiency in 1937 (Inches)
January	3.81	4.67	+0.86
February	3.55	1.86	—1.69
March	3.98	3.77	—0.21
April	3.73	5.25	+1.52
May	3.54	3.63	+0.09
June	3.36	4.19	+0.83
July	3.68	1.64	—2.04
August	4.15	4.61	+0.46
September	3.60	3.55	—0.05
October	3.67	4.22	+0.55
November	3.85	6.10	+2.25
December	3.69	3.75	+0.06
Totals	44.61	47.24	+2.63

Flow of Streams

Sudbury River

The average yield of the Sudbury River during the year 1937 was 1.739 cubic feet per second, or 1,124,000 gallons per day per square mile of drainage area. The normal flow of this stream for the 63 years during which records have been maintained by this Department is 1.513 cubic feet per second, or 978,000 gallons per day per square mile. The average daily yield for the past year during the six driest months, June to November, inclusive, was 491,000 gallons per day per square mile, or 26.2 per cent greater than the normal.

The following table shows the relation between the average daily yield of the Sudbury River per square mile in each month of the year 1937 and the normal yield of the river during the past 63 years. The drainage area of the Sudbury River at the point of measurement is 75.2 square miles.

Table showing the Average Daily Yield of the Sudbury River for Each Month in the Year 1937, in Cubic Feet per Second per Square Mile of Drainage Area, and in Million Gallons per Day per Square Mile of Drainage Area; also Departure from the Normal.

Month	Normal Yield		Actual Yield in 1937		Excess or Deficiency	
	Cubic Feet per Second per Square Mile	Million Gallons per Day per Square Mile	Cubic Feet per Second per Square Mile	Million Gallons per Day per Square Mile	Cubic Feet per Second per Square Mile	Million Gallons per Day per Square Mile
January	1.782	1.152	3.497	2.260	+1.715	+1.109
February	2.291	1.481	2.291	1.481	+ .000	+ .000
March	4.183	2.704	2.622	1.695	—1.561	—1.009
April	3.115	2.013	2.830	1.829	— .285	— .184
May	1.678	1.085	2.107	1.362	+ .429	+ .277
June	.808	.522	1.232	.796	+ .424	+ .274
July	.291	.188	.278	.179	— .013	— .009
August	.311	.201	.194	.126	— .117	— .075
September	.414	.268	.262	.169	— .152	— .099
October	.610	.394	.548	.354	— .062	— .040
November	1.200	.776	2.085	1.348	+ .885	+ .572
December	1.523	.984	2.961	1.914	+1.438	+ .930
Average for whole year	1.513	.978	1.739	1.124	+ .226	+ .146

The rainfall on the Sudbury River watershed and the total yield expressed in inches in depth (inches of rainfall collected) for each of the past six years, 1932–1937, inclusive, together with the average for a period of sixty-three years, are given in the following table:

Rainfall, in Inches, received and collected on the Sudbury River Drainage Area

Month	1932			1933			1934			1935		
	Rainfall	Rainfall collected	Per Cent collected	Rainfall	Rainfall collected	Per Cent collected	Rainfall	Rainfall collected	Per Cent collected	Rainfall	Rainfall collected	Per Cent Collected
January	4.69	1.835	39.1	2.36	1.854	78.5	3.85	3.031	78.7	7.01	3.339	47.7
February	2.59	1.384	53.4	4.09	1.539	37.6	4.36	.751	17.2	3.25	2.269	69.9
March	5.51	3.288	59.7	7.13	5.245	73.5	4.73	4.780	101.1	1.82	4.877	267.5
April	2.19	3.126	142.9	5.65	6.331	112.1	3.59	4.720	131.3	5.08	4.516	88.8
May	1.55	.819	52.8	2.49	1.300	52.1	3.70	2.283	61.7	2.40	1.587	66.1
June	3.28	.162	5.0	1.47	.205	13.9	4.53	.791	17.5	5.41	1.883	34.8
July	1.92	—.175	— 9.1	2.13	—.206	— 9.7	2.91	—.061	— 2.1	1.83	.171	9.3
August	5.21	.056	1.1	3.53	—.137	— 3.9	2.10	—.058	— 2.8	1.63	—.150	—9.2
September	10.57	2.185	20.7	10.25	2.118	20.7	8.56	1.411	16.5	3.93	.187	4.8
October	6.59	3.067	46.6	2.98	.954	32.0	3.26	1.340	41.0	0.53	—.182	—34.2
November	5.10	5.030	98.6	1.11	.693	62.4	2.68	1.045	38.9	4.98	.751	15.1
December	1.92	1.692	87.7	4.05	1.084	26.8	3.02	1.471	48.7	1.03	.665	64.7
Totals and averages	51.12	22.469	43.9	47.24	20.980	44.4	47.29	21.504	45.5	38.90	19.913	51.2

Rainfall, in Inches, received and collected on the Sudbury River Drainage Area—Cont.

Month	1936			1937			Mean for Sixty-three Years (1875-1937)		
	Rainfall	Rainfall collected	Per Cent collected	Rainfall	Rainfall collected	Per Cent collected	Rainfall	Rainfall collected	Per Cent collected
January	8.10	2.847	35.1	4.67	4.032	86.4	4.05	2.055	50.8
February	4.12	1.363	33.1	2.38	2.386	100.2	3.94	2.406	61.0
March	9.68	11.551	119.3	3.60	3.023	84.0	4.30	4.823	112.1
April	3.28	4.011	122.4	4.84	3.157	65.2	3.69	3.475	94.2
May	2.62	1.448	55.2	7.82	2.430	63.6	3.21	1.934	60.2
June	2.41	.326	13.5	4.24	1.375	32.4	3.33	.902	27.1
July	1.18	—.168	—14.3	1.51	.320	21.2	3.49	.335	9.6
August	5.17	.021	0.4	4.60	.224	4.9	3.82	.358	9.4
September	5.57	.417	7.5	3.16	.292	9.2	3.63	.462	12.7
October	2.09	.620	29.6	3.60	.631	17.5	3.55	.703	19.8
November	1.66	.510	30.8	6.41	2.326	36.3	3.79	1.339	35.3
December	8.65	5.116	59.2	3.93	3.414	86.9	3.77	1.755	46.5
Totals and averages	54.53	28.062	51.5	46.76	23.610	50.5	44.57	20.547	46.1

The following table gives the record of the yield of the Sudbury River in gallons per day per square mile for each of the past six years and the mean for the past sixty-three years:

Yield of the Sudbury River Drainage Area in Gallons per Day per Square Mile[1]

Month	1932	1933	1934	1935	1936	1937	Mean for Sixty-three Years, 1875-1937
January	1,029,000	1,040,000	1,699,000	1,872,000	1,596,000	2,260,000	1,152,000
February	830,000	955,000	466,000	1,408,000	817,000	1,481,000	1,481,000
March	1,843,000	2,941,000	2,680,000	2,734,000	6,476,000	1,695,000	2,704,000
April	1,814,000	3,673,000	2,738,000	2,620,000	2,327,000	1,829,000	2,013,000
May	459,000	729,000	1,280,000	890,000	812,000	1,362,000	1,085,000
June	94,000	119,000	458,000	1,091,000	189,000	796,000	522,000
July	—98,000	—115,000	—34,000	96,000	—94,000	179,000	188,000
August	31,000	— 77,000	—33,000	—84,000	12,000	126,000	201,000
September	1,264,000	1,225,000	816,000	108,000	241,000	169,000	268,000
October	1,719,000	535,000	751,000	—102,000	348,000	354,000	394,000
November	2,914,000	401,000	605,000	435,000	295,000	1,348,000	776,000
December	949,000	608,000	825,000	373,000	2,868,000	1,914,000	984,000
Average for whole year	1,067,000	999,000	1,024,000	948,000	1,332,000	1,124,000	978,000
Average for driest six months	578,000	344,000	424,000	136,100	163,900	491,000	389,000

[1]The drainage area of the Sudbury River used in making up these records included water surfaces amounting to about 2 per cent of the whole area from 1875 to 1878, inclusive, subsequently increasing by the construction of storage reservoirs to about 3 per cent in 1879, to 3.5 per cent in 1885, to 4 per cent in 1894, and to 6.5 per cent in 1898. The drainage area also contains extensive areas of swampy land, which, though covered with water at times, are not included in the above percentages of water surfaces.

Nashua River

The average yield of the South Branch of the Nashua River at the outlet of the Wachusett Reservoir in Clinton during the year 1937 was 1,357,000 gallons per day per square mile of drainage area, or about 22½ per cent above the average for the past 41 years. The average rainfall on this watershed during 1937 was 52.09 inches or about 14.1 per cent in excess of the normal.

The average yield for the six driest months, May to October, inclusive, was 737,000 gallons per day per square mile of drainage area, or 29 per cent greater than the normal for the six driest months.

There were deficiencies in the yield during the months of March, July, August, and September, and the yield was in excess of the normal during the remainder of the year, the excess in January being the greatest for this month since the records were started in 1897.

The following table shows the normal yield of the South Branch of the Nashua River by months for the past 41 years, the actual yield in the year 1937 and the excess or deficiency in each month. The drainage area of the Nashua River above the point of measurement was 119 square miles from 1897 to 1907, 118.19 square miles from 1908 to 1913, inclusive, and from January 1, 1914 to July 1, 1937 inclusive, 108.84 square miles. July 1, 1937 the area was reduced 1.15 square miles by the diversion of the watershed of East Waushacum Pond leaving the net drainage area 107.69 square miles.

Table showing the Average Daily Yield of the South Branch of the Nashua River for Each Month in the Year 1937, in Cubic Feet per Second per Square Mile of Drainage Area, and in Million Gallons per Day per Square Mile of Drainage Area; also Departure from the Normal.

Month	Normal Yield		Actual Yield in 1937		Excess or Deficiency	
	Cubic Feet per Second per Square Mile	Million Gallons per Day per Square Mile	Cubic Feet per Second per Square Mile	Million Gallons per Day per Square Mile	Cubic Feet per Second per Square Mile	Million Gallons per Day per Square Mile
January	1.919	1.240	3.676	2.376	+1.757	+1.136
February	1.968	1.272	2.419	1.563	+ .451	+ .291
March	4.056	2.622	2.417	1.562	—1.639	—1.060
April	3.565	2.304	3.606	2.331	+ .041	+ .027
May	2.010	1.299	2.714	1.754	+ .704	+ .455
June	1.282	.828	1.528	.988	+ .246	+ .160
July	.696	.450	.511	.330	— .185	— .120
August	.623	.403	.620	.401	— .003	— .002
September	.653	.422	.609	.394	— .044	— .028
October	.764	.494	.833	.539	+ .069	+ .045
November	1.298	.839	3.581	2.317	+2.283	+1.478
December	1.761	1.138	2.748	1.776	+ .987	+ .638
Average for whole year	1.714	1.108	2.100	1.357	+ .386	+ .249

The rainfall on the Nashua River watershed and the total yield expressed in inches in depth upon the watershed (inches of rainfall collected) for each of the past six years, 1932 to 1937, inclusive, together with the average for the past 41 years, are given in the following table:

Rainfall, in Inches, received and collected on the Nashua River Drainage Area

Month	1932			1933			1934			1935		
	Rainfall	Rainfall collected	Per Cent collected	Rainfall	Rainfall collected	Per cent Collected	Rainfall	Rainfall collected	Per Cent collected	Rainfall	Rainfall collected	Per Cent collected
January	5.71	3.024	53.0	2.71	2.323	85.8	3.87	2.698	69.7	6.80	4.014	59.0
February	3.14	1.906	60.7	4.78	2.457	51.4	4.11	1.315	32.0	3.63	2.332	64.2
March	5.25	3.218	61.3	5.92	4.677	79.0	4.26	5.053	118.7	2.19	4.927	225.5
April	2.10	4.234	201.1	6.39	8.336	130.5	4.41	6.111	138.6	4.09	3.971	97.1
May	1.58	1.260	79.7	2.58	1.942	75.2	4.21	3.015	71.6	2.67	1.997	74.9
June	2.27	.585	25.8	1.93	.742	38.5	5.10	1.644	32.3	5.89	2.308	39.2
July	3.55	.383	10.8	2.16	.401	18.6	2.35	.577	24.6	2.81	.891	31.7
August	4.23	.503	11.9	4.68	.564	12.0	2.40	.245	10.2	2.13	.367	17.2
September	7.31	.880	12.0	10.88	3.020	27.8	9.64	1.614	16.7	4.63	.678	14.6
October	7.38	2.708	36.7	3.40	1.463	43.1	2.94	1.400	47.6	.73	.352	48.1
November	5.21	3.992	76.7	1.68	1.034	61.6	2.76	1.757	63.7	4.67	1.092	23.4
December	2.20	1.916	87.2	3.86	1.388	35.9	4.16	2.181	52.4	1.18	.847	71.9
Totals and averages	49.93	24.609	49.3	50.97	28.347	55.6	50.21	27.610	55.0	41.42	23.776	57.4

Rainfall, in Inches, received and collected on the Nashua River Drainage Area—Cont.

Month	1936			1937			Mean for Forty-one Years 1897-1937		
	Rainfall	Rainfall collected	Per Cent collected	Rainfall	Rainfall collected	Per Cent collected	Rainfall	Rainfall collected	Per Cent collected
January	8.03	3.304	41.2	5.36	4.239	79.0	3.88	2.212	57.1
February	2.89	1.418	49.1	2.33	2.519	108.1	3.74	2.066	55.2
March	11.04	12.635	114.5	3.63	2.786	76.9	4.14	4.676	112.9
April	3.68	4.475	121.5	5.49	4.018	73.2	3.92	3.975	101.4
May	3.45	2.249	65.1	4.23	3.129	74.0	3.32	2.317	69.8
June	2.84	.914	32.2	4.27	1.705	39.9	3.85	1.430	37.2
July	2.26	.540	23.8	1.77	.589	33.2	3.84	.802	20.9
August	5.35	.636	11.9	4.62	.715	15.5	4.03	.718	17.8
September	4.71	.583	12.4	3.90	.681	17.5	3.98	.729	18.3
October	3.18	1.037	32.5	4.47	.961	21.5	3.28	.881	26.9
November	1.68	.709	42.2	8.44	3.999	47.4	3.73	1.449	38.8
December	8.19	4.069	49.7	3.58	3.169	88.6	3.93	2.030	51.7
Totals and averages	57.30	32.569	56.8	52.09	28.510	54.7	45.64	23.285	51.0

The following table gives the record of the yield of the Nashua River watershed in gallons per day per square mile for each of the past six years and the mean for the past 41 years.

Yield of the Nashua River Drainage Area in Gallons per Day per Square Mile[1]

Month	1932	1933	1934	1935	1936	1937	Mean for Forty-one Years, 1897-1937
January	1,695,000	1,302,000	1,513,000	2,250,000	1,853,000	2,376,000	1,240,000
February	1,143,000	1,525,000	816,000	1,447,000	850,000	1,563,000	1,272,000
March	1,804,000	2,622,000	2,832,000	2,762,000	7,083,000	1,562,000	2,622,000
April	2,456,000	4,836,000	3,545,000	2,303,000	2,596,000	2,331,000	2,304,000
May	706,000	1,089,000	1,690,000	1,119,000	1,261,000	1,754,000	1,299,000
June	339,000	430,000	953,000	1,337,000	530,000	988,000	828,000
July	215,000	225,000	323,000	500,000	303,000	330 000	450,000
August	282,000	316,000	137,000	206,000	357,000	401,000	403,000
September	509,000	1,747,000	933,000	392,000	337,000	394,000	422,000
October	1,518,000	820,000	785,000	198,000	581,000	539,000	494,000
November	2,313,000	599,000	1,018,000	633,000	411,000	2,317,000	839,000
December	1,074,000	778,000	1,223,000	475,000	2,281,000	1,776,000	1,138,000
Average for whole year	1,169,000	1,350,000	1,315,000	1,132,000	1,547,000	1,357,000	1,108,000
Average for driest six months	597,000	682,300	687,100	399,150	419,700	737,000	571,000

[1]The drainage area used in making up these records included water surfaces amounting to 2.2 per cent of the whole area from 1897 to 1902, inclusive, to 2.4 per cent in 1903, to 3.6 per cent in 1904, to 4.1 per cent in 1905, to 5.1 per cent in 1906, to 6 per cent in 1907, to 7 per cent in 1908, 1909 and 1910, to 6.5 per cent in 1911, to 6.8 per cent in 1912, to 7 per cent in 1913, to 7.4 per cent in 1914 and 1915, to 7.6 per cent in 1916, to 7.4 per cent in 1917 and 1918, to 7.5 per cent in 1919, 1920, 1921 and 1922, to 7.4 per cent in 1923 and 1924, to 6.4 per cent in 1925, to 5.9 per cent in 1926, to 5.7 per cent in 1927, to 7.6 per cent in 1928, to 7.4 per cent in 1929, to 5.6 per cent in 1930, to 6 per cent in 1931, to 7.3 per cent in 1932, to 7.6 per cent in 1933 to 7.6 per cent in 1934, to 7.6 per cent in 1935, to 7.4 per cent in 1936, and 7.6 per cent in 1937.

Merrimack River

The Merrimack River is the second largest stream in the State of Massachusetts. It rises in the White Mountains in the State of New Hampshire and flows southerly through the central part of that state until it enters Massachusetts, where it turns to the east and flows in a general northeasterly direction the remainder of its course to the sea. The total length of its watershed from its extreme northerly limits in the mountains of northern New Hampshire to its extreme southerly limits in the hills of Hopkinton, Massachusetts, is about 137 miles and its extreme width is about 66 miles. The total drainage area above the mouth of the river at Newburyport comprises about 5,000 square miles, of which about one-quarter or 1,250 square miles are within the limits of Massachusetts and three-quarters or 3,750 square miles are within the State of New Hampshire.

Records of the flow of the Merrimack River have been kept continuously at Lawrence in the office of the Essex Company since 1880. The original drainage area of the river at that point was 4,663 square miles and included 118.19 square miles tributary to the South Branch of the Nashua River used for the water supply of the Metropolitan Water District and in part for the city of Worcester, 75.2 square miles on the Sudbury River, and 18 square miles tributary to Lake Cochituate. The flow as measured at Lawrence includes the water wasted from these drainage areas. In presenting the record of the flow of the river these drainage areas have been deducted, leaving the net drainage area above Lawrence 4,567 square miles in 1880, 4,570 square miles in 1891 to 1897, inclusive, and 4,452 square miles since that date. The quantity of water overflowing from the Cochituate and Sudbury watersheds as measured by the Metropolitan District Commission also has been deducted from the flow of the river as measured at Lawrence. The average flow of the river during the year 1937 amounted to 2.074 cubic feet per second per square mile, which is 40.0 per cent more than normal for the past 58 years. The flow was more than normal during the months of January, February, April, May, June, July, October, November and December and less than the normal during the months of March, August and September. The greatest deficiency occurred in the month of March.

The following table shows the relation between the normal flow of this stream during the past 58 years and the actual flow during each month of the year 1937:

Table Showing the Average Monthly Flow of the Merrimack River at Lawrence for the Year 1937; also the Normal and Departure therefrom in Cubic Feet per Second per Square Mile of Drainage Area.

Month	Normal Flow, 1880-1937	Actual Flow in 1937	Excess or Deficiency
January	1.322	2.620	+1.298
February	1.359	2.475	+1.116
March	2.817	2.067	— .750
April	3.632	3.679	+ .047
May	2.248	4.289	+2.041
June	1.265	2.104	+ .839
July	.756	.969	+ .213
August	.634	.575	— .059
September	.648	.521	— .127
October	.799	.827	+ .028
November	1.155	2.083	+ .928
December	1.136	2.679	+1.543
Average for whole year	1.481	2.074	+ .593

The following table gives the record of the flow of the Merrimack River at Lawrence for each of the past six years, together with the average flow in the past 58 years, this amount being expressed in cubic feet per second per square mile of drainage area.

Flow of the Merrimack River at Lawrence in Cubic Feet per Second per Square Mile

Month	1932	1933	1934	1935	1936	1937	Mean for fifty-eight Years, 1880-1937
January	1.803	1.333	1.468	3.039	1.687	2.620	1.322
February	1.301	1.295	1.248	1.994	1.413	2.475	1.359
March	1.363	2.392	2.434	3.020	10.408	2.067	2.817
April	4.454	7.363	6.042	3.313	4.477	3.679	3.632
May	1.319	2.144	2.325	2.025	1.867	4.289	2.248
June	.493	.816	.957	2.292	.705	2.104	1.265
July	.499	.406	.479	1.204	.478	.969	.756
August	.483	.509	.450	.515	.359	.575	.634
September	.673	.971	.939	.613	.411	.521	.648
October	1.223	1.367	1.210	.425	.889	.827	.799
November	2.431	1.157	1.475	.859	.969	2.083	1.155
December	1.157	1.187	1.591	1.141	2.306	2.679	1.136
Average for whole year	1.433	1.745	1.718	1.703	2.164	2.074	1.481
Average for driest six months	.782	.871	.918	.793	.635	1.180	.855

Weekly Flow of the Sudbury, Nashua and Merrimack Rivers

The following table shows the weekly fluctuations during the year 1937 in the yield of the Sudbury River at Framingham, the South Branch of the Nashua River at the outlet of the Wachusett Reservoir in Clinton and the Merrimack River at Lawrence. The flow of these streams, particularly that of the Sudbury River and the South Branch of the Nashua River, serves to indicate the flow of other streams in eastern Massachusetts. The area of the Sudbury River watershed is 75.2 square miles, of the South Branch of the Nashua River 108.84 square miles up to July 1, 1937 and thereafter 107.69 square miles, and of the Merrimack River at Lawrence 4,452 square miles.

Table Showing the Average Weekly Flow of the Sudbury, South Branch of the Nashua and the Merrimack Rivers for the Year 1937, in Cubic Feet per Second per Square Mile of Drainage Area

Week ending Sunday —	Yield of Sudbury River	Yield of South Branch Nashua River	Flow of Merrimack River	Week ending Sunday —	Yield of Sudbury River	Yield of South Branch Nashua River	Flow of Merrimack River
Jan. 3	3.399	2.971	2.457	July 4	.583	.886	1.703
10	3.113	3.227	2.390	11	.377	.541	1.203
17	2.925	2.918	2.512	18	.524	.689	.908
24	4.074	4.482	2.920	25	.064	.293	.630
31	4.011	4.118	2.672	Aug. 1	— .017	.376	.566
Feb. 7	1.990	1.835	1.761	8	— .011	.350	.542
14	1.730	2.668	1.707	15	.021	.543	.717
21	2.677	2.569	2.749	22	— .117	.334	.542
28	2.801	2.606	3.683	29	.855	1.264	.516
Mar. 7	1.334	1.445	1.819	Sept. 5	.197	2.722	.529
14	1.240	1.415	1.458	12	.259	.453	.489
21	5.202	4.299	2.479	19	.356	.957	.583
28	3.116	2.782	2.531	26	.260	.295	.490
Apr. 4	1.521	1.847	1.950	Oct. 3	.153	.320	.488
11	3.042	3.973	3.288	10	.001	.289	.425
18	1.806	2.480	3.897	17	— .071	.114	.311
25	3.747	4.527	4.180	24	1.359	2.063	1.346
May 2	3.406	4.188	4.883	31	.970	1.161	1.429
9	1.593	2.269	4.175	Nov. 7	.643	.507	1.066
16	1.854	2.634	4.072	14	1.646	4.029	.945
23	2.314	3.036	5.369	21	2.071	3.611	3.725
30	2.318	3.081	3.425	28	1.357	3.810	1.571
June 6	1.418	1.825	2.504	Dec. 5	5.631	5.880	4.401
13	.790	1.302	2.181	12	4.743	3.783	3.709
20	1.150	1.475	1.733	19	2.677	2.401	2.071
27	2.011	1.653	2.309	26	2.192	2.328	2.106

Examination of Rivers

The usual examinations have been made of the important rivers in the State during the past year, samples having been collected generally during the months of June to November, inclusive. In addition, under the provision of Chapter 66 of the Resolves of 1937, the engineers and chemists of the Works Progress Administration have made special observations of many of the rivers of the State and have collected numerous composite samples in connection with a project sponsored by the Department. A report as required by Chapter 66 of the Resolves of 1937 will be presented to the Legislature on February 1, 1938. This report will cover the Assabet and Concord, Blackstone, Charles, Connecticut, French and Quinebaug, Hoosick, Housatonic, Merrimack, Mystic, Nashua, Neponset, Taunton and the Ten Mile rivers.

Aberjona River

The results of the analyses and observations show that the Aberjona River was very seriously polluted until late in the summer, due to insufficient sewer capacity in the Metropolitan and Woburn sewers and the overflow of sewage during the construction of the new North Metropolitan Relief Sewer. Portions of the North Metropolitan Relief Sewer were put into use in August and since then a marked improvement in the character of this stream has been effected. It was necessary during the early part of the summer to treat the river and a part of the Upper Mystic Lake with chlorine to reduce the objectionable conditions so far as possible, to refer one source of pollution to the Attorney General under the provisions of Chapter 291 of the Acts of 1911 and to assist in the spraying of oil on the surface of the stream and Upper Mystic Lake in order to prevent the emergence of insect life due in part at least to the pollution. It has also been necessary to make certain recommendations relative to the improvement of the Aberjona River Sewer of the city of Woburn. Now that the New Metropolitan Relief Sewer is available, further pollution of this stream should be unnecessary.

Assabet River

Below Hudson and below Maynard this river has been noticeably polluted by industrial wastes but during the past year this pollution disappeared before the

river reached any considerable concentration of population and it has not appeared to be advisable to attempt to use the provisions of Chapter 655 of the Acts of 1914, an act relative to preventing the pollution of the Assabet River, particularly because of an opinion from the Attorney General to the effect that discoloration and an unpleasant appearance of the water do not in themselves constitute a violation of an act similar to that on the Assabet River. During the past year a plan has been prepared for the treatment of the sewage of the Lyman School and the Westborough State Hospital by joint works, the effluent from which would discharge into the Assabet River near the Westborough-Northborough line, but no appropriations have as yet been made for these works. In general, the analyses showed a slight improvement in this stream.

Blackstone River

There has been a slight improvement in the condition of the river over the conditions found in 1936. Consideration is to be given in the Department's report to the Legislature under the provisions of Chapter 66 of the Resolves of 1937 to the introduction of legislation for the purpose of preventing the further pollution of this stream.

Charles River

During the past year there has been litigation in regard to the discharge of industrial wastes into a tributary of the Charles River in Medway known as Chicken Brook but the Master hearing the evidence found in favor of the defendant mill. The investigation, under the provisions of Chapter 66 of the Resolves of 1937, has shown pollution by industrial wastes particularly in Needham, Newton, Wellesley and Waltham but this pollution did not appear to be in violation of the provisions of Section 175 of Chapter 111. Recommendations have been made relative to the removal of sewage overflowing into the Charles River Basin particularly from the Charles River Valley Sewer and a bill covering this matter, House 187, is now before the Legislature.

Chicopee River

No special examinations have been made of the Chicopee River and its tributaries, the Quaboag, Swift and Ware rivers. The regular analyses indicate a slight improvement in the condition of this river and its tributaries. Plans which were presented during the year for the collection and treatment of the sewage of the town of Ludlow by screening, aeration and plain sedimentation with separate sludge digestion were approved by the Department on November 16, 1937.

Concord and Sudbury Rivers

The Concord River in its course in Lowell and Hale's Brook, a tributary in Lowell, are polluted by domestic sewage and industrial wastes within that municipality but in the other portions of its course the Concord River has not been found to be in an objectionable condition.

Bannister Brook, one of the tributaries of the Sudbury River in Framingham, has shown evidence of considerable pollution due to the effluents from the Framingham and Natick sewage treatment works, also to the overflow of sewage in connection with the construction of new sewage treatment works at Framingham. It is expected that when the new plant at Framingham is put into operation a marked improvement in the condition of Bannister Brook will be noted.

The Sudbury River below Saxonville has shown an improvement over its condition of the last two years and, judging from the analyses, it has been in a reasonably satisfactory condition during 1937 throughout most of its course.

Connecticut River

Various studies and surveys have been made by the engineers of the Works Progress Administration on the Connecticut River. The sources of sewage and industrial waste pollution have been noted and surveys have been made showing general methods of the collection and treatment of the sewage from many of the larger municipalities adjacent to this stream. This stream has not yet reached the

nuisance stage but floating matters discharged with the domestic sewage create offensive conditions, particularly along the banks of the stream, which may be dangerous to the public health, and the domestic sewage from the communities adjacent to the banks of the river should be collected and subjected to some form of treatment before it is discharged into the river.

French River

Several conferences have been held with the officials of the towns of Webster and Dudley with a view to the preparation of plans for sewerage and sewage disposal, and appropriations have been made by both of these municipalities for engineering studies. Plans for the collection and treatment of the sewage of the town of Dudley were approved by the Department under date of December 20, 1937. These plans provide for works for sedimentation of the sewage and separate sludge disposal similar to the works already provided in Putnam, Connecticut, where a greater dilution is available. While the results of the analyses of samples of the river collected below Webster and Dudley have shown somewhat less pollution than in 1936, this stream nevertheless is one of the most seriously polluted streams in the State and if the towns of Webster and Dudley do not proceed to remove the pollution of this stream legislation should be adopted for the purpose of preventing further pollution.

Under the provisions of Section 23 of Chapter 111 of the General Laws it is recommended that suitable sewage treatment works be provided for the towns of Webster and Dudley at the earliest practicable date.

Hoosick River

In view of the serious complaints relative to the pollution of the Hoosick River, particularly by sewage from the town of Adams where plans were prepared many years ago for the collection and treatment of the sewage, special legislation should be adopted under which the improvement of this stream may be effected. The results of the analyses show a reduction in the average dissolved oxygen in the stream below Adams while at Williamstown there is a slight improvement over conditions in 1936 due evidently to the effect of the sewage treatment plant at North Adams.

Housatonic River

There has been much interest of late in improving the Housatonic River particularly for recreational purposes and during the year 1937 additional works for the treatment of the sewage of the city of Pittsfield were placed in operation. In addition the town of Dalton made an appropriation during the year for an engineering investigation and the plans for the collection and treatment of sewage of that town were approved by the Department on December 20, 1937.

There has been a slight improvement in the condition of the river below Pittsfield and this improvement has been noted downstream.

Plans have been prepared by the engineers of the Works Progress Administration for the collection of the sewage of the town of Lee, and it is understood that the town of Great Barrington is considering the preparation of plans for this purpose. If the sanitary condition of this stream is to be corrected additional legislation will probably be required.

Merrimack River

The Merrimack River is referred to both in Chapter 66 of the Resolves of 1937 and also in Senate Document 100 of the Legislature of 1938. The latter document contains the report of the Joint Board which was directed to study various problems in this valley and contains a draft of an act with reference to the construction of sewage treatment works in the Merrimack River Valley. Under this proposed act the Department of Public Health, after a hearing, may, by its order, direct any city or town to provide such works. A considerable amount of work has been done in this valley by engineers of the Works Progress Administration under a project sponsored by the Department, and this work has included the examination and tabulation of all sewer outlets and industrial plants. In addition, the engineers

of the Works Progress Administration have made a comprehensive survey of means for treating the sewage from a trunk sewer such as that outlined by the Department in Senate Document 492 of the Legislature of 1924.

The usual examinations of the Merrimack River have been made by the Department as required by Chapter 202 of the Acts of 1929, and the results of the analyses both by the chemists of the Works Progress Administration and of this Department show that the stream is grossly polluted below Lawrence but its condition is not materially different from that found in recent years.

Millers River

This stream has been under investigation by engineers of the Works Progress Administration at intervals during the past two years and that organization has practically completed its report. The Otter River below Gardner has showed a decided lack of dissolved oxygen during 1937, the lowest determination which was in July being only 15.6% of saturation. As indicated elsewhere in this report, more effective sewage disposal works should be provided in Gardner.

Nashua River

The results of the analyses show an increase in pollution below Fitchburg but above the sewage treatment plant due very largely to industrial wastes. In accordance with the court order of February 21, 1933, good progress has been made on the construction of the treatment works for the city of Leominster but until the industrial wastes are removed from the North Branch of this stream it will continue to be in an objectionable condition and legislation will doubtless be necessary in order to correct this situation.

Neponset River

The investigation carried on under the provisions of Chapter 66 of the Resolves of 1937 has shown three instances where the special laws relative to the pollution of the Neponset River apparently have been violated. Communications have been sent to the concerns involved and in at least one instance an improvement has been effected. The condition of the stream in the upper portions of its course at times has been unsatisfactory, and during 1937 complaint has been made relative to the pollution of the stream in the lower portion of its course. The analytical results have shown in general an improvement in the sanitary condition of this stream in recent years but the river in certain portions of its course is not in a satisfactory condition. With the improvements recently recommended by the Department and the extensions of the sewerage system in Stoughton and Canton further improvement is to be expected. It is important that all pollution of the Neponset River from domestic sewage and objectionable industrial waste be prevented by suitable connections with the local sewers which have an outlet into the South Metropolitan Sewerage System. One concern expends daily about $135 for waste treatment and it is a question how much further the industrial concerns can or should go in the expenditures of funds for additional treatment works.

North River in Salem and Peabody

The North River continues to be the most seriously polluted stream in Massachusetts and complaint was again made to the Department during the past year. Until legislation such as that proposed in House Document 1250 of 1935 is adopted, the Department is unable to effect any improvement in the condition of this stream.

Quinebaug River

No particular change has occurred in the condition of the Quinebaug River during the past year.

Taunton River

Complaint was made to the Department during 1937 in connection with the pollution of the Salisbury Plain River below Brockton, and various conferences have been held with the authorities of the city and representatives of industrial plants from which wastes are discharged into the river rather than into the sanitary

sewerage system. In addition, sewage was found overflowing from the Brockton sewage pumping station on one occasion. Further conferences are to be held in regard to this matter, but it is doubtful if any considerable relief can be afforded until the present excess annual charges by the city of Brockton for sewer connections are modified. Late last year a complaint was brought to the attention of the Massachusetts authorities by the Governor of Rhode Island because of the pollution of Mount Hope Bay into which the Taunton River discharges. The complaint was due to the sewage discharged into the river from the cities of Fall River and Taunton, and in connection with the ensuing investigation the Department found it necessary to condemn additional areas of Mount Hope Bay for the taking of shellfish. Plans have been prepared for the collection and disposal of sewage from the cities of Taunton and Fall River but the necessary appropriations have not been made.

If the sanitary condition of this stream is to be improved, legislation will doubtless be necessary. Such legislation was recommended by the Department in 1920. A statement relative to the Taunton River will appear in the Department's report to the Legislature under the provisions of Chapter 66 of the Resolves of 1937. The results of the analyses show no particular change in the character of this river and its tributaries during 1937.

Ten Mile River

No particular change has been noted in the character of this stream during the year.

Municipal Sewage Treatment Works

In accordance with the duties of the Department under Section 5 of Chapter 111 of the General Laws this Division has examined all of the sewage treatment works in the State during the past year and in connection with these examinations has caused samples of the raw, settled and filtered sewage to be analyzed. The analyses made in connection with the operation of these works include determinations of Biochemical Oxygen Demand.

Attleboro

Plans for the preliminary treatment of the sewage of the city of Attleboro before it is discharged onto the sewage filter beds have not been prepared in accordance with recommendations of the Department, and the discharge of sewage onto the filter beds without the removal of solid matters interferes with the efficient operation and doubtless adds to the cost of maintenance. It is to be assumed that when the work of improving the water supplies of this city is completed suitable steps will be taken in the preparation of plans for the preliminary treatment of the sewage. During the past year the sewage has been somewhat weaker than in recent years. The analyses of the filter effluent show that the applied sewage was well filtered. It has been impracticable to properly purify all of the sewage discharged to the works, and it is again recommended that plans be prepared for additional treatment works.

Barnstable

The new sewage treatment works for the village of Hyannis were placed in operation during the past year. This plant consists of Imhoff tanks, open sludge beds and eight sand filters having an aggregate area of 4.0 acres. The sewage of the village of Hyannis is collected at a pumping station and pumped to the disposal works. The works are located at an isolated point, are operated under intelligent care and thus far the operation has been satisfactory.

Brockton

The sewage treatment works at Brockton have been operated under expert supervision during the year. The final effluent of the trickling filter has at times during periods of dry weather been noticeable in the river below the works, but in general the sewage has been well purified. The effluent from the sand filter beds also has been satisfactory.

Clinton

These works have been operated in a somewhat more satisfactory manner than in recent years and less untreated sewage has been allowed to overflow. In addition the analyses of the effluent show that the applied sewage has been reasonably well filtered. The results, however, show increasing evidence from time to time of the pollution of the stream into which the effluent is discharged. Modern sewage treatment works should be constructed for the treatment of sewage from this municipality.

Concord

Examinations of these works have shown no particular change in management during the past year and the results of the analyses show that the sewage is being well filtered. Frequent inspections have shown that some of the beds are dosed with too great quantities of sewage, indicating lack of suitable distribution on the various beds. It is desirable that the sewage be distributed over the entire area each day so far as practicable.

Easthampton

While most of the sewage of the town of Easthampton is conveyed to the sewage disposal works located near the Manhan River, only about 15% of the settled sewage has been passed through the sand filters. This town appears to have made no further progress during the year on plans for conveying its sewage to works providing for partial treatment to be located near the Connecticut River as considered in 1936. During the past year engineers of the Works Progress Administration have made a survey of a possible plan for conveying the sewage of Easthampton to the vicinity of the Ox-Bow where partial treatment works would be constructed for the treatment of the sewage from Easthampton and Northampton jointly.

Fitchburg

A portion of the Imhoff tanks has been under reconstruction during the past year but the sewage appears to have been somewhat lighter than in recent years and the final effluent was of better quality than in any year since 1933. These works are under competent management though there has been evidence of lack of necessary labor from time to time. Consideration was being given at the end of the year to the construction of additional sludge beds with Federal assistance.

Foxborough

During the past year new works for the treatment of the sewage collected in a surface water drainage system serving a part of the main village of Foxborough were put into operation. These works consist of a small settling tank, eight sand filters having a total area of 0.69 of an acre and two subsurface filter beds having an aggregate area of 1.3 acres. During much of the year sewage is by-passed these works but during the drier portion of the year relief from pollution of the tributaries of the Rumford River is effected. A sanitary sewerage system should be constructed in the thickly-settled parts of this town.

Framingham

Considerable progress has been made at the sewage treatment works of Framingham during the past year on the construction of the new Imhoff tanks and trickling filters with Federal assistance and, while it has appeared inadvisable to place the new works in operation during the cold weather, there appears to be no reason why they should not be put into operation in the spring. The construction of these new works has caused certain difficulties in the operation of the existing works during the year, but these conditions should be overcome early in 1938. Particular attention has been given by the Division to the placing of crushed stone in the trickling filter and the Department has found it necessary to advise a change in size and methods of placing. Venturi meters have been installed at the new works so that definite records of the quantity of sewage can be made.

Franklin

No steps have been taken to convey the sewage from the Timnah Brook filters to the main sewage treatment plant on Mine Brook in Franklin as previously recommended by the Department. The Mine Brook filters appeared to have operated with reasonable satisfaction during the year but the owner of certain lands a short distance below these works has entered into litigation with the town because of alleged damages to his property from the sewerage works of the town of Franklin.

Gardner

The sewage treatment works at Gardner have been obsolete for some time and are not adequate for the proper disposal of all the sewage of this city. A more modern type of treatment plant would doubtless effect a reduction in the cost of operation, prevent the overflow of considerable quantities of sewage and further pollution of the Millers River. It is understood that during the past year the authorities of the city were giving some consideration to the construction of additional treatment works. It is recommended that a modern type of treatment plant adequate for its needs be provided by this city at the earliest practicable date.

Hopedale

This plant was operated with satisfactory results during the past year, and the results of the analyses show that the sewage disposed of through these works is well treated.

Hudson

The efficiency of the purification of the sewage at the works in Hudson during the past year has been somewhat less satisfactory than usual, but the works have been maintained in more continuous operation than in the last two or three years and at no time was any overflow of sewage directly to the river observed.

Leicester

Special examinations of the sewage disposal works at Leicester were made by the Works Progress Administration in connection with its investigation of the pollution of the French River during the past year. These works were constructed many years ago and considerable sewage has been allowed to overflow from them at times into the swamp between the filters and the river. An offensive odor is frequently noticeable in the vicinity of this swamp. Additional works as recommended by the Department in a communication dated May 31, 1935, should be constructed.

Leominster

A statement relative to the sewage treatment works of the city of Leominster is given in the special report of the Department to the Legislature under the provisions of Chapter 66 of the Resolves of 1937. The city of Leominster is required by an order of the Superior Court dated February 21, 1933, to remove its sewage from the Nashua River by February 1, 1938, and the works required by the court order were so far completed that the preliminary settling tank, sludge digestion tank and sludge storage tank were placed in operation on August 2, 1937. The Department is informed by the officials of both the city of Leominster and the town of Lancaster that a satisfactory agreement has been reached under which the city of Leominster may have a further period of time, viz., June, 1938, to put its new works into full operation.

Marion

This plant has received more attention during the past year than in earlier years and while the rate of operation is excessive the efficiency has been somewhat better than in 1936. The results of the analyses show that the sewage has been well treated in its passage through the filters.

Marlborough

The sewage treatment works of the city of Marlborough have been operated in an efficient manner during the past year, and the results of the analyses show that the filter effluent has been of satisfactory character.

Maynard

The sewage from the property of the American Woolen Company was discharged into the main sewerage system of the town at the end of the year 1936, and during the past year there has been an increase in the quantity of sewage to be treated at the Maynard sewage treatment works. These works appear to be adequate for this additional quantity and have continued to operate in a satisfactory manner during the year.

Medfield

The sewage treatment works of the town of Medfield are not satisfactorily operated and some of the filters are constructed of poor filtering material. Also the settling tank is of inadequate capacity for the quantity of sewage passed through it. The Department recommends that the old filters at this plant be reconstructed with suitable filtering material properly underdrained and that a larger settling tank be installed. More attention should be given to the operation of this plant.

Milford

Early in the year certain wastes discharged into the Milford sewerage system were found to be having a detrimental effect on the operation of the Imhoff tanks and particularly the older trickling filter, while the new trickling filter constructed in 1936 showed signs of clogging by these wastes. As a result, the Department found it necessary to recommend that the wastes in question be treated before being discharged into the sewerage system of the town. Considerable quantities of sewage were allowed to overflow because of the condition of the filters due to this waste. It was practicable, however, to put the entire works into operation in April, 1937, and to operate them with good results during the remainder of the year. Now that the new Imhoff tanks and trickling filters have come into well-balanced operation the old sand filter beds are to be used only for the quantity of sewage in excess of the capacity of the newer portions of the works or during periods when the new tanks are being cleaned. It is important that more expert care be used in the operation of this somewhat complicated plant if action relative to pollution of the Charles River under the provisions of Section 175 of Chapter 111 of the General Laws is to be prevented.

Nantucket

Complaint was again made to this Department during the past summer relative to the offensive odors in the vicinity of the sewage disposal works at Nantucket, and an examination showed that in spite of the construction of additional filter beds considerable unpurified sewage escaped through a break in the dike to the low areas adjacent to the filters. Additional filter beds have been constructed under Federal assistance and the available area is now approximately 8.0 acres. No settling tanks are available for preliminary treatment. Comparatively little attention is given to the management of these sewage disposal works and with the additions constructed during the past year it is important that the sewage be more evenly distributed and that the sludge be removed from the filter beds at more frequent intervals.

Natick

The new works at Natick, consisting of Imhoff tanks, a trickling filter and secondary sedimentation tanks, which were placed in operation in 1935, have operated with a slight increase in efficiency during the past year and the final effluent has shown an increase in nitrification. Some difficulty has been experienced at this plant in the formation of scum in the Imhoff tanks and also in the secondary tanks.

North Adams

The partial treatment of the sewage of this city by plain sedimentation has resulted during the past year in the removal of somewhat over 37 per cent of the Biochemical Oxygen Demand, a slightly better efficiency than in 1936. The sewage was chlorinated during the period July 7 to October 15, the average dosage of chlorine being slightly over 6 parts per million. Somewhat better sludge digestion

has been obtained during the past year, thus producing a larger quantity of gas. The examinations during the year showed that the plant was reasonably free from odors and that it has been operated with care throughout the year.

Northbridge

This plant is operated at the limit of its capacity and, while the operation has been under as efficient control as is possible, an addition to the disposal works should be provided as soon as practicable if the further pollution of the Blackstone River is to be prevented. It is important that a suitable measuring device be installed at this plant during the coming year in order to obtain more definite information as to the operation of the plant.

Pittsfield

A new trickling filter plant was placed in operation in September, 1937, for the sewage of Pittsfield and at the time of the most recent examination by an engineer from this Division about 80 per cent of the sewage of the city was being treated by the new works consisting of a dosing tank, a new trickling filter having an area of 1.24 acres 10 feet deep and two mechanically cleaned secondary settling tanks having an aggregate capacity of 270,000 gallons. This filter has been operated at rates varying from 2.8 to 3.9 million gallons per day per acre. The new works had not been in operation a sufficient length of time at the end of the year to make definite determinations of their efficiency but appeared to be operating satisfactorily.

Sewage was allowed to overflow without treatment on 61 days during the year 1937. This was due in part to heavy runoff and in part to changes in connection with the construction of the new works. The old sand filters have been operated with rather poor results during the year, and it is desirable that some of these filters be reconstructed so that they can be used for the treatment of all the sewage in excess of that which can properly be treated at the new works.

North Attleborough

Special observations have been made of the sewage disposal works of North Attleborough by the engineers of the Works Progress Administration and by this Department in connection with the investigation under Chapter 66 of the Resolves of 1937. The results of the analyses of sewage and effluent show a reasonable degree of efficiency in the operation of these works, but the quantity of sewage discharged upon the filters is somewhat greater than they are capable of properly purifying, and the Department has recommended that additional filters be provided. Portions of the sewerage system of the town of North Attleborough are constructed with underdrains, and there has been evidence at times of the discharge of sewage from two of these underdrainage systems into the Ten Mile River. This has appeared to be only a temporary condition, however, but the officials of the town should determine whether or not there are any direct connections by means of which sewage can enter the underdrainage systems. At times of heavy rain the quantity of sewage increases considerably, and at times sewage escapes from the treatment works to the river without treatment. The capacity of this plant should be increased, and additional assistance should be provided for its proper operation.

Southbridge

No particular change has occurred at the Southbridge sewage treatment works during the past year. The sludge has been removed from the settling tanks more frequently than in past years, and this has resulted in a decrease of odors in the vicinity. The general operation of the plant has been better than in 1936, but as pointed out in the 1936 Annual Report consideration should be given to the construction of more modern works, the cost of the operation of which mightbe considerably less than the cost of proper maintenance of the present sand filters.

Spencer

The recommendations contained in the 1936 Annual Report relative to settling tanks for the preliminary treatment of the sewage and the removal of surface water from the sewerage system of this town have not been carried out and considerable

quantities of sewage overflow at times of storm. The old filter beds of the town are in poor condition but the new works constructed in 1935 have operated satisfactorily.

Stockbridge

In 1936 the Department recommended that less water be used in flushing the dosing tank at the Stockbridge sewage treatment works, and that an investigation be made relative to reducing the quantity of water discharged from the automatic flush tanks on the sewerage system. The overall efficiency of the plant has been reasonably satisfactory during the year, but in view of the interest in preventing the pollution of the Housatonic River enlargements should be made at this plant. Sewage from the Park Street sewer is discharged into the river without treatment. It is desirable that some means be provided by the town for measuring the quantity of sewage discharged to the stream, and in any improvement of the Housatonic River the Park Street sewage should be discharged into the main system and additional treatment works should be provided.

Westborough

There has been a lack of attention to the proper distribution of sewage on the various filters making up the Westborough sewage disposal works, and the results of the treatment have not been as good as in recent years. The river below the discharge of the treated sewage has shown the result of improper purification of the sewage during the drier portion of the year.

Winchendon

The results of the operation of the Winchendon sewage treatment works have shown an improvement over previous years. Toward the end of the year the town was considering the installation of an apparatus for recording the quantity of sewage treated in accordance with previous recommendations of the Department.

Worcester

Some difficulty has again been experienced during the year 1937 in the pooling of the sewage on trickling filters at the Worcester sewage treatment works. During the year some of the surface stone has been removed from the filter to make distribution more thorough. This work has been carried on with Federal assistance. The results of the treatment processes have been at times somewhat less satisfactory than in previous years due apparently to the pooling on the filters, but in the main the final effluent has been reasonably satisfactory. Complaint was made during the year relative to the breeding of psychoda flies in these filters, and the Department recommended under date of October 1, 1937, that a program of flooding the filters be carried out in future fly-breeding seasons. The Department in its report to the Legislature under the provisions of Chapter 66 of the Resolves of 1937 refers to the works for the treatment of sewage from the city of Worcester.

Results of Analyses and Records of Operation

The average results of the analyses of samples collected at the various municipal treatment works, except those in connection with some of the smaller plants together with other statistics relative to these works, are shown in the following tables. The analyses show conditions only at the time the samples were collected.

TABLE No. 1.—*Average Results of the Analyses of Samples of Sewage as received at Disposal Works where Rather Complete Treatment is Provided.*

(Parts per Million)

City or Town	Residue on Evaporation				Ammonia				Kjeldahl Nitrogen	Chlorides	Alkalinity	Iron		Fats	Oxygen Consumed	B.O.D.
	Total Residue		Loss on Ignition			Albuminoid										
	Total	*Suspended	Total	*Suspended	Free	Total	Dissolved	Suspended				Total	Dissolved			
Attleboro	350	148	185	122	28.1	5.17	3.40	1.77	12.6	32	133	1.7	0.60	–	48	143
Brockton	615	295	269	250	46.5	9.15	5.62	3.53	21.0	74	206	1.8	0.53	88	115	328
Clinton	427	277	285	240	26.9	9.34	6.12	3.22	21.9	52	144	1.7	0.59	112	120	212
Concord	320	130	167	109	24.9	4.40	2.83	1.57	10.8	26	111	0.9	0.34	40	38	113
Easthampton	412	133	239	108	39.0	5.88	3.70	2.18	13.2	29	149	1.0	0.24	–	56	150
Fitchburg	254	78	117	45	20.5	2.93	2.02	0.91	7.6	26	105	2.7	1.7	23	38	63
Framingham[1]	635	242	357	176	40.0	7.42	5.29	2.13	17.6	45	203	1.9	0.60	65	72	242
Framingham[2]	725	308	404	197	32.5	8.17	5.60	2.57	20.5	51	224	2.9	0.80	82	105	277
Franklin	436	278	247	232	34.3	6.73	4.38	2.35	15.7	40	150	1.1	0.40	–	55	202
Gardner (Gardner Area)	–	263	–	217	36.0	8.03	5.83	2.20	18.7	48	159	1.6	0.57	67	86	238
Gardner (Templeton Area)	653	312	372	269	55.6	11.01	7.14	3.87	22.9	44	222	2.0	0.50	91	90	240
Hopedale	596	486	333	362	43.0	8.75	6.22	2.53	19.6	47	178	3.7	0.88	73	83	263
Hudson	584	295	355	235	62.9	11.56	7.05	4.51	23.4	48	228	1.8	0.47	89	94	262
Leicester	278	89	131	75	23.7	3.75	2.84	0.91	10.9	22	127	0.6	0.25	–	39	112
Lenox	430	144	185	74	10.6	2.52	1.56	0.96	7.6	13	199	2.7	0.22	19	30	58
Marion	279	92	165	79	13.7	2.80	1.73	1.07	6.3	24	69	1.2	0.62	–	31	84
Marlborough	611	296	372	248	52.3	9.60	5.90	3.70	21.2	50	233	1.8	0.50	88	81	227
Maynard	913	469	594	368	81.8	16.66	9.80	6.86	34.5	62	266	3.1	0.46	145	130	437
Medfield	439	130	209	105	21.6	4.43	2.45	1.98	10.6	23	110	0.6	0.24	32	41	145
Milford	600	225	299	187	37.5	6.30	4.46	1.84	15.1	40	168	1.2	0.40	77	69	255
Millis	212	41	96	28	11.5	1.63	1.03	0.60	4.4	23	78	4.2	0.63	–	25	43
Natick	688	321	409	256	31.1	7.71	4.16	3.55	17.7	41	164	1.6	0.51	88	87	228
North Adams	428	171	239	139	27.2	5.47	3.49	1.98	12.4	27	167	0.8	0.22	50	56	159
North Attleborough	277	111	145	90	14.7	3.30	1.82	1.48	7.9	21	85	0.8	0.32	–	34	50
Northbridge	476	274	308	242	35.2	7.41	4.62	2.79	15.3	31	148	2.4	0.53	–	75	188
Pittsfield	397	122	185	96	20.5	4.13	2.85	1.28	10.0	35	182	1.0	0.25	26	46	193
Southbridge	411	212	221	177	38.8	6.77	4.19	2.58	17.0	41	158	1.1	0.35	71	60	218
Spencer	411	179	260	152	20.7	5.71	3.68	2.03	14.0	30	92	1.6	0.38	65	66	140
Stockbridge	241	56	114	41	16.7	3.28	1.99	1.29	7.9	22	165	0.6	0.20	–	26	118
Westborough	469	231	292	139	32.2	6.30	3.86	2.44	15.6	28	138	1.3	0.39	.72	68	168
Winchendon	513	249	312	211	31.3	7.26	3.84	3.42	17.4	30	152	2.4	0.92	–	37	163
Worcester	936	441	407	275	20.8	6.33	2.22	4.11	19.8	93	103	44.0	8.0	91	97	168

[1]Entrance to Imhoff tanks. [2]At Pumping Station. *Beginning 1937 determined by Gooch crucible method.

TABLE No. 2.—*Average Results of the Analyses of Samples of Sewage as Applied to Filter Beds after Preliminary Treatment*

[Parts per Million]

City or Town	Form of Preliminary Treatment	Residue on Evaporation: Total Residue: Total	Residue on Evaporation: Total Residue: Suspended	Residue on Evaporation: Loss on Ignition: Total	Residue on Evaporation: Loss on Ignition: Suspended	Ammonia: Free	Ammonia: Albuminoid: Total	Ammonia: Albuminoid: Dissolved	Ammonia: Albuminoid: Suspended	Kjeldahl Nitrogen	Chlorides	Alkalinity	Iron: Total	Iron: Dissolved	Fats	Oxygen Consumed	B. O. D.
Attleboro	None	350	148	185	122	28.1	5.17	3.40	1.77	12.6	32	133	1.7	0.60	–	48	143
Brockton	Sedim'n Tanks	509	181	257	154	50.8	7.43	4.40	3.03	16.2	73	204	1.3	0.63	57	89	227
Clinton	Sedim'n Basins	257	45	116	38	21.2	3.80	2.83	0.97	8.8	35	101	1.3	0.77	23	36	84
Concord	None	320	130	167	109	24.9	4.40	2.83	1.57	10.8	26	111	0.9	0.34	40	38	113
Easthampton	Sedim'n Tanks	355	100	191	81	35.9	4.85	3.22	1.63	13.0	28	145	0.8	0.23	–	44	146
Fitchburg	Imhoff Tanks	241	64	106	42	20.1	2.89	2.06	0.83	6.7	25	103	2.6	1.5	21	34	43
Framingham	Imhoff Tanks	435	94	213	69	40.7	5.50	4.22	1.28	11.7	45	202	1.4	0.71	33	41	167
Franklin	Sedim'n Tanks	321	50	157	44	25.1	3.03	2.02	1.01	7.3	29	115	0.9	0.45	–	31	120
Gardner (Gardner Area)	None	–	263	–	217	36.0	8.03	5.83	2.20	18.7	48	159	1.6	0.57	67	86	238
Gardner (Templeton Area)	Sedim'n Tanks	386	108	186	86	43.2	5.72	3.81	1.91	13.4	34	174	1.4	0.61	34	46	132
Hopedale	Septic Tanks	372	138	221	111	38.6	5.62	4.20	1.42	13.8	32	143	1.8	0.68	–	44	210
Hudson	Sedim'n Tanks	434	136	220	106	44.5	5.11	3.46	1.65	11.0	42	188	1.5	0.67	48	53	165
Leicester	None	278	89	131	75	23.7	3.75	2.84	0.91	10.9	22	127	0.6	0.25	–	39	112
Lenox	Sedim'n Tank	287	33	121	25	11.0	1.81	1.19	0.62	4.1	13	196	0.8	0.32	11	16	35
Marion	Sedim'n Tanks	147	38	60	27	11.2	1.82	1.32	0.50	4.0	22	61	1.0	0.61	–	18	32
Marlborough	Sedim'n Tanks	298	124	115	101	42.3	5.95	3.87	2.08	13.0	41	184	1.3	0.60	52	56	118
Maynard	Imhoff Tank	389	86	189	74	51.3	5.09	3.58	1.51	11.9	48	208	1.4	0.69	37	46	178
Medfield	None	439	130	209	105	21.6	4.43	2.45	1.98	10.6	23	110	0.6	0.24	32	41	145
Milford	Imhoff Tanks (Old)	425	80	178	68	29.8	3.95	2.35	1.60	8.6	60	144	1.0	0.47	40	44	141
Milford	Imhoff Tanks (New)	420	85	178	73	33.5	4.27	2.92	1.35	10.1	47	156	0.8	0.49	48	48	146
Millis	None	212	41	96	28	11.5	1.63	1.03	0.60	4.4	23	78	4.2	0.63	–	25	43
Natick	Imhoff Tank	421	79	179	63	29.2	4.18	2.81	1.37	9.2	42	178	0.9	0.48	39	50	148
North Adams	Sedim'n Tanks	339	96	173	76	23.8	4.08	2.95	1.13	10.1	25	169	0.7	0.24	31	43	99
North Attleborough	Sedim'n Tanks	242	54	111	41	14.5	1.92	1.52	0.40	5.9	20	84	0.9	0.33	–	29	47
Northbridge	Sedim'n Tanks	269	94	143	80	27.9	4.10	2.98	1.12	9.6	27	126	1.2	0.56	–	41	108
Pittsfield	Sedim'n Tank	365	58	164	44	20.2	3.00	2.35	0.65	8.1	36	184	0.7	0.28	21	34	107
Southbridge	Sedim'n Tanks	355	103	177	90	34.6	5.05	3.52	1.53	10.5	36	159	1.0	0.50	44	51	158
Spencer	None	411	179	260	152	20.7	5.71	3.68	2.03	14.0	30	92	1.6	0.38	65	66	140
Stockbridge	None	241	56	114	41	16.7	3.28	1.99	1.29	7.9	22	165	0.6	0.20	–	26	118
Westborough	None	469	231	292	139	32.2	6.30	3.86	2.44	15.6	28	138	1.3	0.39	72	68	168
Winchendon	Sedim'n Tanks	273	60	125	52	26.8	3.60	2.38	1.22	7.7	29	126	1.8	1.1	–	33	72
Worcester	Imhoff Tanks	552	151	180	86	25.9	3.34	1.67	1.67	9.1	75	106	25.3	2.8	36	53	86

TABLE No. 3.—*Efficiency of Settling Tanks and Other Forms of Preliminary Treatment as Indicated by the Foregoing Tables.*

[Parts per Million and Per Cent.]

City or Town	Form of Preliminary Treatment	Detention Period (Hours)	Suspended Solids			Total Albuminoid Ammonia			Chlorides		Fats			Oxygen Consumed			B. O. D.		
			Raw Sewage	Settled or treated Sewage	Per Cent Removed	Raw Sewage	Settled or treated Sewage	Per Cent Removed	Raw Sewage	Settled or treated Sewage	Raw Sewage	Settled or treated Sewage	Per Cent Removed	Raw Sewage	Settled or treated Sewage	Per Cent Removed	Raw Sewage	Settled or treated Sewage	Per Cent Removed
Brockton	Sedim'n Tanks	2.4	295	181	39	9.15	7.43	19	74	73	88	57	35	115	89	23	328	227	31
Clinton	Sedim'n Basins	6.6	277	45	84	9.34	3.80	59	52	35	112	23	79	120	36	70	212	84	60
Easthampton	Sedim'n Tanks	–	133	100	25	5.88	4.85	18	29	28	–	–	–	56	44	21	150	146	3
Fitchburg	Imhoff Tanks	7.1	78	64	18	2.93	2.89	1	26	25	23	21	9	38	34	11	63	43	32
Framingham	Imhoff Tanks	–	242	94	61	7.42	5.50	26	45	45	65	33	49	72	41	43	242	167	31
Franklin	Sedim'n Tanks	7.4	278	50	82	6.73	3.03	55	40	29	–	–	–	55	31	44	202	120	41
Gardner (Templeton Area)	Sedim'n Tanks	–	312	108	65	11.01	5.72	48	44	34	91	34	63	90	46	49	240	132	45
Hopedale	Septic Tanks	7.8	486	138	72	8.75	5.62	36	47	32	73	–	–	83	44	47	263	210	20
Hudson	Sedim'n Tanks	17.8	295	136	54	11.56	5.11	56	48	42	89	48	46	94	53	44	262	165	37
Lenox	Sedim'n Tank	–	144	33	77	2.52	1.81	28	13	13	19	11	42	30	16	47	58	35	40
Marion	Sedim'n Tanks	14.9	92	38	59	2.80	1.82	35	24	22	–	–	–	31	18	42	84	32	62
Marlborough	Sedim'n Tanks	8.4	296	124	58	9.60	5.95	38	50	41	88	52	41	81	56	31	227	118	48
Maynard	Imhoff Tank	7.5	469	86	82	16.66	5.09	69	62	48	145	37	75	130	46	65	437	178	59
Milford	Imhoff Tank (Old)	2.5	225	80	64	6.30	3.95	37	40	60	77	40	48	77	44	43	255	141	45
Milford	Imhoff Tanks (New)	2.9	225	85	62	6.30	4.27	32	40	47	77	48	38	77	48	38	255	146	43
Natick	Imhoff Tanks	–	321	79	75	7.71	4.18	46	41	42	88	39	56	87	50	43	228	148	35
North Adams	Sedim'n Tanks	1.9	171	96	44	5.47	4.08	25	27	25	50	31	38	56	43	23	159	99	38
No. Attleborough	Sedim'n Tanks	–	111	54	51	3.30	1.92	42	21	20	–	–	–	34	29	15	50	47	6
Northbridge	Sedim'n Tanks	2.4	274	94	66	7.41	4.10	45	31	27	–	–	–	75	41	45	188	108	43
Pittsfield	Sedim'n Tank	–	122	58	52	4.13	3.00	27	35	36	26	21	19	46	34	26	193	107	45
Southbridge	Sedim'n Tanks	3.2	212	103	51	6.77	5.05	25	41	36	71	44	38	60	51	15	218	158	28
Winchendon	Sedim'n Tanks	–	249	60	76	7.26	3.60	50	30	29	–	–	–	37	33	11	163	72	56
Worcester	Imhoff Tanks	2.6	441	151	66	6.33	3.34	47	93	75	91	36	60	97	53	45	168	86	49

TABLE No. 4. — *Average Results of the Analyses of Sewage applied to the Trickling Filters at Brockton, Fitchburg, Maynard, Milford, Natick, Pittsfield and Worcester, and their Effluents, Per Cent Removed, etc.*

[Parts per Million]

Brockton

	Residue on Evaporation				Ammonia				Kjeldahl Nitrogen	Chlorides	Nitrogen as		Fats	Oxygen Consumed	B. O. D.	Remarks
	Total Residue		Loss on Ignition			Albuminoid										
	Total	Suspended	Total	Suspended	Free	Total	Dissolved	Suspended			Nitrates	Nitrites				
Settled sewage as applied to trickling filter.	509	181	257	154	50.8	7.43	4.40	3.03	16.2	73	–	–	57	89	227	Trickling filter has an area of 2.0 acres and a depth of 10 feet of stone from 1.5 to 3 inches in size.
Effluent from trickling filter.	423	78	167	64	21.4	2.97	1.83	1.14	5.9	67	12.80	0.88	15	45	–	One half of filter used alternately. The average rate of operation was about 1,402,000 gallons per day.
Per cent removed.	17	57	35	58	58	60	58	62	64	8	–	–	74	49	–	
Settled effluent from trickling filter.	384	78	143	63	24.7	2.85	1.54	1.31	6.7	68	14.45	0.80	12	42	19	
Per cent removed by secondary settling tank.	9	0	14	2	–	4	16.	–	–	–	–	9	20	7.	–	Period of sedimentation averaged about 1.5 hours.
Per cent removed by trickling filter and secondary settling tank.	25	57	44	59	51	62	65.	57.	59.	7.	–	–	79.	53	92.	Tanks cleaned 51 times.

Fitchburg

Settled sewage as applied to trickling filter.	241	64	106	42	20.1	2.89	2.06	0.83	6.7	25	–	–	21	34	43	Trickling filter has an area of 2.14 acres and a depth of 10 feet of stone from 1 to 3 inches in size.
Effluent from trickling filter.	251	66	115	42	4.2	1.88	0.99	0.89	4.7	24	11.78	0.23	–	18	8	The average rate of operation was about 1,670,000 gallons per acre per day for area used (1.86 acres).
Per cent removed.	–	–	–	0	79	35	52	–	30	4	–	–	–	47	81	
Settled effluent from trickling filter as discharged to Nashua River.	275	37	122	22	4.2	1.20	0.68	0.52	2.9	24	14.28	0.25	–	16	7	
Per cent removed by secondary settling tank.	–	44	–	48	0	36	31	42	38	0	–	–	–	11	13	Period of sedimentation about 2 hours.
Per cent removed by trickling filter and secondary settling tank.	–	42	–	48	79	58	67	37	57	4	–	–	–	53	84	Tanks cleaned 26 times.

Maynard

Settled sewage as applied to trickling filter.	389	86	189	74	51.3	5.09	3.58	1.51	11.9	48	–	–	37	46	178	Trickling filter has an area of .25 of an acre and a depth of 7 feet of stone from 1½ to 2½ inches in size.
Effluent from trickling filter.	431	44	179	35	22.4	2.40	1.43	0.97	5.4	46	15.04	0.43	–	24	8	The average rate of operation was about 588,000 gallons per acre per day.
Per cent removed.	–	49	5	53	56	53	60	36	55	4	–	–	–	48	96	
Settled effluent from trickling filter as discharged to Assabet River.	384	36	165	29	22.2	2.43	1.60	0.83	5.3	49	14.88	0.79	–	22	21	
Per cent removed by secondary settling tank.	11.	18	8	17.	1	–	–	14	2	–	1	–	–	8	–	Period of sedimentation about 7.5 hours.
Per cent removed by trickling filter and secondary settling tank.	1.	58	13	61	57.	52.	55	45	55	–	–	–	–	52	88	Tanks cleaned 20 times.

TABLE No. 4.—*Average Results of the Analyses of Sewage applied to the Trickling Filters at Brockton, Fitchburg, Maynard, Milford, Natick, Pittsfield and Worcester, and their Effluents, Per Cent Removed, etc.*—Continued.

[Parts per Million]

Milford

	Residue on Evaporation				Ammonia						Nitrogen as					
	Total Residue		Loss on Ignition			Albuminoid										
	Total	Suspended	Total	Suspended	Free	Total	Dissolved	Suspended	Kjeldahl Nitrogen	Chlorides	Nitrates	Nitrites	Fats	Oxygen Consumed	B. O. D.	Remarks
Settled sewage as applied to trickling filter.*	423	83	178	71	31.7	4.11	2.64	1.47	9.4	54	–	–	44	46	144	Old trickling filter has an area of .28 of an acre and a depth of 6 feet of stone from 1 to 1¾ inches in size.
Effluent from trickling filter.*	370	67	146	48	10.8	2.35	1.11	1.24	5.5	55	12.55	0.60	–	24	26	
Per cent removed.	13	19	18	32	66	43	58	16	41	–	–	–	–	48	82	New trickling filter has an area of .47 of an acre and a depth of 6 feet of stone from ¾ to 1½ inches in size.
Settled effluent from trickling filter as discharged to Charles River.*	353	60	123	44	10.1	2.18	1.08	1.10	5.5	56	12.7	0.56	–	21	25	
Per cent removed by secondary settling tank.	5	10	16	8	6	7	3	11	0	–	–	7	–	13	4	Period of sedimentation (old and new tanks) averaged about 1 hour.
Per cent removed by trickling filter and secondary settling tank.	17	28	31	38	68.	47	59	25	41	–	–	–	–	54	83.	New tank cleaned 2 times; old tank cleaned 15 times.

* Ave. old and new plants.

Natick

Settled sewage as applied to trickling filter.	421	79	179	63	29.2	4.18	2.81	1.37	9.2	42	–	–	39	50	148	Trickling filter has an area of .75 of an acre and a depth of 8 feet of stone from 1 to 2 inches in size.
Effluent from trickling filter.	373	51	150	36	8.8	2.41	1.38	1.03	50	42	13.59	0.70	–	29	33	The average rate of operation was about 1,150,000 gallons per acre per day.
Per cent removed.	11	35	16	43	70	42	51.	25	46	0	–	–	–	42	78	
Settled effluent from trickling filter as discharged to Bannister Brook.	378	49	155	34	7.3	2.22	1.35	0.87	4.7	41	13.99	0.80	–	28	29	
Per cent removed by secondary settling tank.	–	4	–	6	17	8	2	16	6	2	–	–	–	3	12	Period of sedimentation averaged about 1.4 hours.
Per cent removed by trickling filter and secondary settling tank.	10	38	13	46	75	47.	52	36	49	2	–	–	–	44	80	

Pittsfield

Settled sewage as applied to trickling filter.**	404	75	168	57	24.0	3.97	3.27	0.70	10.1	31	–	–	26	36	120	Trickling filter has an area of 1.25 acres and a depth of 10 feet of stone from 1 to 2½ inches in size.
Effluent from trickling filter.**	387	60	154	43	21.9	3.37	2.45	0.92	8.8	46	577	0.42	–	26	49	
Per cent removed.	4	20	8	25	9	15	25	–	13	–	–	–	–	28	59	
Settled effluent from trickling filter as discharged to Housatonic River.**	334	24	117	16	16.6	2.88	1.89	0.99	6.2	41	4.45	0.48	–	18	40	
Per cent removed by secondary settling tank.	13	60	24	63	24	15	23	–	30	–	23	–	–	31	18	
Per cent removed by trickling filter and secondary settling tank.	17	68	30	72	31	27	42	–	49	–	–	–	–	50	67	

** Ave. Oct., Nov., Dec. only.

TABLE NO. 4.—*Average Results of the Analyses of Sewage applied to the Trickling Filters at Brockton, Fitchburg, Maynard Milford, Natick, Pittsfield and Worcester, and their Effluents, Per Cent Removed, etc.*—Concluded

[Parts per Million]

Worcester

	Residue on Evaporation				Ammonia						Nitrogen as					Remarks
	Total Residue		Loss on Ignition			Albuminoid										
	Total	Suspended	Total	Suspended	Free	Total	Dissolved	Suspended	Kjeldahl Nitrogen	Chlorides	Nitrates	Nitrites	Fats	Oxygen Consumed	B. O. D.	
Settled sewage as applied to trickling filter.	552	151	180	86	25.9	3.34	1.67	1.67	9.1	75	–	–	36	53	86	Trickling filters have an area of 13.68 acres and a depth of 10 feet of stone from 1 to 3 inches in size.
Effluent from trickling filter.	485	76	96	38	17.7	1.37	0.75	0.62	4.1	65	2.83	0.25	19	22	18	The average rate of operation was about 1,690,000 gallons per acre per day for area used. (12.49 acres).
Per cent removed.	12	50	47	56	32	59	55	63	55	13	–	–	47	58	79	
Settled effluent from trickling filter as discharged to Blackstone River.	454	50	121	27	16.7	1.27	0.68	0.59	4.2	59	3.18	0.23	18	17	14	
Per cent removed by secondary settling tank.	6	34	–	29	6	7	9	65	–	9	–	8.	5	23	22	Period of sedimentation averaged about 2.0 hours.
Per cent removed by trickling filter and secondary settling tank.	18	67	33	69	36	62	59	5	54	21	–	–	50	68	84	

TABLE No. 5.—*Average Results of Analyses of Monthly Samples of Effluent from Sand Filters*

[Parts per Million]

City or Town	Free Ammonia	Total Albuminoid Ammonia	Kjeldahl Nitrogen	Nitrogen as Nitrates	Nitrogen as Nitrites	Chlorides	Iron	B.O.D.
Attleboro	5.9	0.81	1.9	11.49	0.48	28	2.5	8
Brockton	13.9	1.06	2.7	12.37	0.24	72	4.6	7
Clinton	3.1	0.30	0.8	9.75	0.19	32	2.2	1
Concord	0.1	0.11	0.6	13.13	0.08	23	0.1	–
Easthampton	11.9	0.83	2.2	6.12	0.28	25	2.0	5
Framingham (new beds)	21.9	1.59	3.5	3.17	0.29	53	6.4	17
Framingham (old beds)	19.2	1.13	2.7	3.10	0.14	56	8.3	14
Franklin	6.5	0.63	1.9	12.73	0.42	29	3.0	5
Gardner (Gardner Area)	11.4	1.89	5.2	14.32	0.51	43	1.3	14
Gardner (Templeton Area)	19.9	1.26	2.9	14.78	0.47	36	3.2	9
Hopedale	11.4	0.76	2.0	21.12	0.06	31	0.5	1
Hudson	20.8	1.96	4.6	2.87	0.32	39	6.6	21
Leicester	9.7	0.81	1.7	3.30	0.36	17	2.7	6
Lenox	1.7	0.25	0.7	5.58	0.08	12	0.8	4
Marion	0.6	0.30	1.3	7.73	0.19	32	0.2	2
Marlborough	10.8	0.64	1.8	13.28	0.47	38	0.9	6
Medfield	5.1	0.71	2.1	9.22	0.25	24	1.3	39
Millis	0.1	0.20	0.5	8.38	0.26	20	0.1	1
North Attleborough	3.7	0.59	1.4	4.00	0.46	17	1.1	2
Northbridge	4.1	0.48	1.4	10.29	0.30	21	6.7	9
Pittsfield	15.7	1.57	3.7	1.92	0.19	39	6.1	38
Southbridge	15.9	0.61	1.8	3.40	0.12	25	5.4	4
Spencer (new beds)	6.6	0.70	2.5	7.32	0.33	20	8.7	3
Spencer (old beds)	7.0	0.31	1.0	0.57	0.18	18	7.6	3
Stockbridge	1.9	0.50	1.2	4.95	0.07	11	1.2	4
Westborough	12.6	1.10	3.1	5.74	0.50	24	1.8	13
Winchendon	4.8	0.57	1.5	12.07	0.48	23	0.6	3

TABLE No. 6.—*Efficiency of Sand Filters. (Per Cent Removal)*

[Parts per Million and Per Cent]

City or Town	Free Ammonia			Total Albuminoid Ammonia			Kjeldahl Nitrogen			Chlorides		B. O. D.		
	Applied Sewage	Effluent	Per Cent Removal	Applied Sewage	Effluent	Per Cent Removal	Applied Sewage	Effluent	Per Cent Removal	Applied Sewage	Effluent	Applied Sewage	Effluent	Per Cent Removal
Attleboro	28.1	5.9	79	5.17	0.81	84	12.6	1.9	85	32	28	142	8	94
Brockton	50.8	13.9	73	7.43	1.06	86	16.2	2.7	83	73	72	113	7	94
Clinton	21.2	3.1	85	3.80	0.30	92	8.8	0.8	91	35	32	84	1	99
Concord	24.9	0.1	99	4.40	0.11	98	10.8	0.6	94	26	23	113	–	–
Easthampton	35.9	11.9	67	4.85	0.83	83	13.0	2.2	83	28	25	146	5	97
Framingham (new beds)	40.7	21.9	46	5.50	1.59	71	11.7	3.5	70	45	53	167	17	90
Framingham (old beds)	32.5	19.2	41	3.17	1.13	86	20.5	2.7	87	51	56	277	14	95
Franklin	25.1	6.5	74	3.03	0.63	79	7.3	1.9	74	29	29	120	5	96
Gardner (Gardner Area)	36.0	11.4	68	8.03	1.89	76	18.7	5.2	72	48	43	238	14	94
Gardner (Templeton Area)	43.2	19.9	54	5.72	1.26	78	13.4	2.9	78	34	36	132	9	93
Hopedale	38.6	11.4	70	5.62	0.76	86	13.8	2.0	86	32	31	210	1	99
Hudson	44.5	20.8	53	5.11	1.96	62	11.0	4.6	58	42	39	165	21	87
Leicester	23.7	9.7	59	3.75	0.81	78	10.9	1.7	84	22	17	112	6	95
Lenox	11.0	1.7	85	1.81	0.25	86	4.1	0.7	83	13	12	35	4	89
Marion	11.2	0.6	95	1.82	0.30	84	4.0	1.3	68	22	32	32	2	94
Marlborough	42.3	10.8	74	5.95	0.64	89	13.0	1.8	86	41	38	118	6	95
Medfield	21.6	5.1	76	4.43	0.71	84	10.6	2.1	80	23	24	145	39	73
Millis	11.5	0.1	99	1.63	0.20	88	4.4	0.5	89	23	20	43	1	98
North Attleborough	14.5	3.7	74	1.92	0.59	69	5.9	1.4	76	20	17	47	2	96
Northbridge	27.9	4.1	85	4.10	0.48	88	9.6	1.4	85	27	21	108	9	92
Pittsfield	20.2	15.7	22	3.00	1.57	48	8.1	3.7	54	36	39	107	38	64
Southbridge	34.6	15.9	54	5.05	0.61	88	10.5	1.8	83	36	25	158	4	97
Spencer (new beds)	20.7	6.6	68	5.71	0.70	88	14.0	2.5	82	30	20	140	3	98
Spencer (old beds)	20.7	7.0	66	5.71	0.31	95	14.0	1.0	93	30	18	140	3	98
Stockbridge	16.7	1.9	89	3.28	0.50	85	7.9	1.2	85	22	11	118	4	97
Westborough	32.2	12.6	61	6.30	1.10	83	15.6	3.1	80	28	24	168	13	92
Winchendon	26.8	4.8	82	3.60	0.57	84	7.7	1.5	81	29	23	72	3	96

TABLE No. 7.—*Summary of Efficiency of Sewage Disposal Works. (Per Cent Removed from Raw Sewage of Final Effluent).*

[Parts per Million and Per Cent]

City or Town	Suspended Solids			Free Ammonia			Total Albuminoid Ammonia			Kjeldahl Nitrogen			Chlorides		Oxygen Consumed			B.O.D.		
	Raw Sewage	Final Effluent	Per Cent Removal	Raw Sewage	Final Effluent	Per Cent Removal	Raw Sewage	Final Effluent	Per Cent Removal	Raw Sewage	Final Effluent	Per Cent Removal	Raw Sewage	Final Effluent	Raw Sewage	Final Effluent	Per Cent Removal	Raw Sewage	Final Effluent	Per Cent Removal
Attleboro	–	–	–	28.1	5.9	79	5.17	0.81	84	12.6	1.9	85	32	28	48	10	79	143	8	94
Brockton	295	32	89	46.5	13.9	70	9.15	1.06	88	21.0	2.7	87	74	72	115	17	85	328	7	98
Clinton	–	–	–	26.9	3.1	88	9.34	0.30	97	21.9	0.8	96	52	32	120	5.3	96	212	1	99
Concord	–	–	–	24.9	0.1	99	4.40	0.11	98	10.8	0.6	94	26	23	38	2.1	94	113	–	–
Easthampton	–	–	–	39.0	11.9	69	5.88	0.83	86	13.2	2.2	83	29	25	56	10	82	150	5	97
Fitchburg	78	37	53	20.5	4.2	80	2.93	1.20	59	7.6	2.9	62	26	24	38	15	61	63	7	89
Framingham (new beds)	242	47	81	40.0	21.9	45	7.42	1.59	79	17.6	3.5	80	45	53	72	17	76	242	17	93
Framingham (old beds)	308	43	86	32.5	19.2	41	8.17	1.13	86	20.5	2.7	87	51	56	105	15	86	277	14	95
Franklin	278	20	93	34.3	6.5	81	6.73	0.63	91	15.7	1.9	88	40	29	55	9.3	83	202	5	98
Gardner (Gardner Area)	263	25	90	36.0	11.4	68	8.03	1.89	76	18.7	5.2	72	48	43	86	19	78	238	14	94
Gardner (Templeton Area)	–	–	–	55.6	19.9	64	11.01	1.26	89	22.9	2.9	87	44	36	90	15	83	240	9	96
Hopedale	–	–	–	43.0	11.4	73	8.75	0.76	91	19.6	2.0	90	47	31	83	11	87	263	1	99
Hudson	295	36	88	62.9	20.8	67	11.56	1.96	83	23.4	4.6	80	48	39	94	23	76	262	21	92
Leicester	89	13	85	23.7	9.7	59	3.75	0.81	78	10.9	1.7	84	22	17	39	9.1	77	112	6	95
Lenox	–	–	–	10.6	1.7	84	2.52	0.25	90	7.6	0.7	91	13	12	30	8	73	58	4	93
Marion	–	–	–	13.7	0.6	96	2.80	0.30	89	6.3	1.3	79	24	32	31	4.6	85	84	2	98
Marlborough	–	–	–	52.3	10.8	79	9.60	0.64	93	21.2	1.8	91	50	38	81	9.2	89	227	6	97
Maynard	469	36	92	81.8	22.2	73	16.66	2.43	85	34.5	5.3	85	62	49	130	22	83	437	21	95
Medfield	–	–	–	21.6	5.1	76	4.43	0.71	84	10.6	2.1	80	23	24	41	14	66	145	39	73
Milford	225	60	73	37.5	10.1	73	6.30	2.18	65	15.1	5.5	64	40	56	69	21	70	255	25	90
Millis	–	–	–	11.5	0.1	99	1.63	0.20	88	4.4	0.5	89	23	20	25	6	76	43	1	98
Natick	321	49	85	31.1	7.3	77	7.71	2.22	71	17.7	4.7	73	41	41	87	28	68	228	29	87
North Adams	171	96	44	27.2	23.8	12	5.47	4.08	25	12.4	10.1	19	27	25	56	43	23	159	99	38
North Attleborough	–	–	–	14.7	3.7	75	3.30	0.59	82	7.9	1.4	82	21	17	34	6.2	82	50	2	96
Northbridge	–	–	–	35.2	4.1	88	7.41	0.48	94	15.3	1.4	91	31	21	75	6.7	91	188	96	95
Pittsfield	122	43	65	20.5	15.7	23	4.13	1.57	62	10.0	3.7	63	35	39	46	15	67	193	38	80
Southbridge	–	–	–	38.8	15.9	59	6.77	0.61	91	17.0	1.8	89	41	25	60	9.8	84	218	4	98
Spencer (new beds)	179	27	85	20.7	6.6	68	5.71	0.70	88	14.0	2.5	82	30	20	66	8.6	87	140	3	98
Spencer (old beds)	–	–	–	20.7	7.0	66	5.71	0.31	95	14.0	1.0	93	30	18	66	7.1	89	140	3	98
Stockbridge	–	–	–	16.7	1.9	89	3.28	0.50	85	7.9	1.2	85	22	11	26	7.2	72	118	4	97
Westborough	–	–	–	32.2	12.6	61	6.30	1.10	83	15.6	3.1	80	28	24	68	14	79	168	13	92
Winchendon	–	–	–	31.3	4.8	85	7.26	0.57	92	17.4	1.5	91	30	23	37	7.9	79	163	3	98
Worcester	441	50	89	20.8	16.7	20	6.33	1.27	80	19.8	4.2	79	93	59	97	17	82	168	14	92

TABLE No. 8.—*Extent of Sewerage Works, Rate of Flow, and Rate of Operation of Filters*

City or Town	Population, Census of 1935	Approximate Length of Sanitary Sewers (Miles)	Approximate Number of House Connections	Estimated Quantity of Sewage Treated (Gallons per Day)			Estimated Quantity of Sewage per Connection	Net Area of Filter Beds (Acres)	Estimated Rate of Operation with Even Distribution. (Gallons per Acre per Day)
				Average for Year	Average for Month of Maximum Flow	Average for Month of Minimum Flow			
Attleboro	21,835	37.91	1,892	1,014,000	1,379,000	590,000	536	15.50	65,000
Brockton	62,407	111.34	8,916	3,190,000[1]	4,234,000	2,414,000	358	37.00	–
Clinton	12,373	25.90	1,944	1,639,000	1,724,000	1,207,000	843	26.23	62,000
Concord	7,723	17.68	775	545,000[2]	782,000	369,000	703	7.41	74,000
Easthampton	10,486	27.94	1,299	–	–	–	–	2.20	–
Fitchburg	41,700	67.52	–	3,110,000	4,210,000	2,540,000	–	–	–
Framingham	22,651	50.10	3,767	1,382,000	1,798,000	938,000	367	28.56	48,000
Franklin	7,494	14.29	870	269,000	462,000	147,000	309	3.24	83,000
Gardner	20,397	38.57	2,628	–	–	–	–	16.50	–
Hopedale	3,068	7.08	370	215,000[3]	269,000	138,000	581	3.79	57,000
Hudson	8,495	14.86	1,176	539,000	630,000	460,000	458	9.00	60,000
Lenox	2,706	9.00	390	–	–	–	–	1.56	–
Leominster	21,894	–	–	1,521,000[7]	2,264,000	1,047,000	–	–	–
Marion	1,867	4.40	254	174,000	264,000	77,000	685	1.53	114,000
Marlborough	15,781	36.90	2,670	923,000	1,513,000	522,000	346	20.19	46,000
Maynard	7,107	9.27	691	147,000	159,000	131,000	213	–	–
Medfield	4,162	–	–	–	–	–	–	1.61	–
Milford	15,008	25.67	1,878	910,000	1,340,000	620,000	484	9.30	–
Millis	2,098	1.50	15	41,000	50,000	27,000	2,733	1.12	37,000
Nantucket	3,495	22.00[4]	1,637[4]	568,000	640,000	491,000	347	8.00[5]	71,000
Natick	14,394	14.72	1,702	860,000	1,430,000	484,000	505	–	–
North Adams	22,085	35.44	4,817	2,638,000	3,019,000	2,058,000	548	–	–
North Attleborough	10,202	17.99	1,083	835,000	893,000	726,000	771	8.75	95,000
Northbridge	10,577	15.98	993	833,000	959,000	601,000	839	12.00	69,000
Pittsfield	47,516	86.07	7,052	5,488,000	5,900,000	4,751,000	778	41.15	133,000
Southbridge	15,786	25.31	1,818	1,012,000	1,346,000	809,000	557	10.95	92,000
Spencer	6,487	10.50	869	960,000	1,214,000	758,000	1,105	12.30	78,000
Westborough	6,773	9.11	615	359,000	641,000	288,000	584	6.62	54,000
Winchendon	6,603	13.02	475	–	–	–	–	4.00	–
Worcester	190,471	249.12[6]	30,855	22,390,000	29,910,000	17,590,000	726	–	–

[1]Includes an average of 2,805,000 gallons per day to trickling filter and 385,000 gallons to sand filters.
[2]Entire quantity of sewage not treated.
[3]New development not included in average.
[4]Four miles of sewers and 184 connections in addition in Siasconset.
[5]No underdrains. Filters drain direct to ocean.
[6]Includes 70.2 miles of combined sewers.
[7]August to December only.

Table No. 9—*General Features*

City or Town	Year of Construction of and Additions to Works	Depth of Underdrains (Feet)	Distance Apart of Underdrains (Feet)	Filtering Material	Attention given to Disposal Works
Attleboro	1912, 1913	4–7	35	Sand and gravel; found in place	One man all the time; others when necessary.
Barnstable	1936	3	50	Sand and gravel; found in place.	One man part time; others when necessary.
Brockton	1893, 1905, 1908, 1912	5.5	30	Sand and gravel; found in place; trickling filter. (See Table No. 4)	One chemist in charge, foreman, day and night man; more when necessary.
Clinton	1898, 1899	8	60–70	Sand and gravel; found in place	Two men all the time; others when necessary.
Concord	1899, 1928, 1934	none	–	Sand underlaid with gravel; found in place	One man once a day.
Easthampton	1908	3.5	20–40	Sand and gravel; largely found in place	One man all the time; others when necessary.
Fitchburg	1914	–	–	Trickling filter	Chemist in charge; 1 foreman, 1 day and 2 night men.
Framingham	1890, 1924 ,1933	–	–	Sand and gravel	One man all the time; others when necessary.
Franklin	1915	4.5	26	Sand and gravel	Very little attention; one man once in a while.
Gardner (Gardner Area)	1891	5	20	Sand; handled in construction	One man all the time; others when necessary.
Gardner (Templeton Area)	1901, 1909, 1931	3–4	20–30	Sand; handled in construction	One man all the time; others when necessary.
Hopedale	1900, 1923	3	35–60	Material—sand and gravel	One man all the time; others when necessary.
Hudson	1904, 1910	5–6	50–100	Sand and gravel; found in place	One man all the time; others when necessary.
Leicester	1894, 1928	4	8	Sand; handled in construction	Very little attention.
Marion	1906, 1930	5	–	Sand; largely found in place	One man every day in summer, every other day in winter.
Marlborough	1891, 1908, 1909, 1910, 1911	4.5–6	30–50	Sand; found in place	One man all the time; others when necessary.
Maynard	1929	–	–	Trickling filter.	One man all the time.
Milford	1907, 1924	5	40	Sand; found in place; trickling filter	One man every day; others when necessary.
Nantucket	1930	–	–	Sand and gravel; found in place	One man when necessary.
Natick	1896	6	36	Sand; found in place	One man all the time; others when necessary.
North Adams	1935	–	–	Preliminary settling tanks; sludge digestion	Two men all the time.
North Attleborough	1909, 1910, 1931	5–6.5	55	Sand and gravel; found in place	One man every day; others when necessary.
Northbridge	1906, 1907, 1920	4	50–75	Sand and gravel; mostly handled	One man all the time; others when necessary.
Pittsfield	1901, 1915, 1937	4	35	Sand; mostly found in place; trickling filter.	One man all the time; others when necessary.
Southbridge	1908, 1925, 1926	4	40	Sand and gravel; considerable quantity handled, some found in place.	One man all the time.
Spencer	1897, 1923, 1935	4	–	Sand and gravel; largely found in place	One man all the time; others when necessary.
Stockbridge	1899, 1921, 1922	3–4.5 3.4–5	23 30	Sand filters Irrigation area, sand	One man all the time.
Westborough	1892, 1911	5	30–40	Sand and gravel; handled in construction	One man all the time; others when necessary.
Winchendon	1928	–	–	Sand and gravel; found in place	One man part time.
Worcester	1898[2,3], 1925			Trickling filters, sand area not in use	Chemist in charge; several men all the time

[1]Sand filters abandoned Nov., 1935. Imhoff tank, trickling filter and secondary tank installed.
[2]Year of first construction of sand filters. Many additions.
[3]Sedimentation tanks and sand beds abandoned 1925. Imhoff tanks, trickling filters and secondary tanks installed.

Examination of Sewer Outlets Discharging into the Sea

Early in the year a plan was presented for the extension of a sewer outlet in town of Hull into the Weir River to the west of Nantasket Beach. This plan was approved as a temporary expedient but a communication was sent to the authorities of the town of Hull under date of February 4, 1937, recommending the construction of a sewerage system for the thickly-settled parts of the town.

The question of sewerage in Mattapoisett was considered during the latter part of the summer and under date of October 20, 1937, the Department recommended an appropriation for an engineering study for a sewerage system in this town.

Preliminary plans for the collection and treatment of sewage of the town of Wareham, the sewage to be discharged onto sand filters, were approved under date of November 15, 1937.

Under date of December 31, 1937, the Department recommended the adoption of a plan for the construction of sewers in the thickly-settled parts of the town of Rockport with a temporary outlet in Doyle's Cove at mean low water.

Conditions in the tidal waters of the Taunton River and Mount Hope Bay due to the discharge of untreated sewage from the city of Taunton and the city of Fall River have continued to be objectionable. The following is quoted from the "Journal" of Providence, Rhode Island, for February 7, 1938:

> ". . . But it is to be noted that the bay's large easterly arm, known as Mount Hope Bay, is also seriously polluted, the chief source of contamination being Fall River, which city, like Pawtucket, dumps its sewage overboard without treatment of any kind.
>
> Mayor Murray of Fall River has demonstrated his interest in dealing constructively with the problem, the National Rivers and Harbors Congress is trying to help the city to work out a solution, and the National Resources Committee some time ago listed Fall River as one of the cities which should have sewage treatment facilities immediately. Up the Taunton River there are communities which discharge sewage that reaches Mount Hope Bay, and the Massachusetts Department of Public Health has asked for legislation that will permit it to require a clean-up, as in the case of the Blackstone.
>
> All of this nurtures hope for action. Public health, conservation and common sense all dictate that there be action. Eighteen years ago Rhode Island adopted legislation intended to secure it. The progress has been too slow and halting. It should be infinitely swifter and more swifter and more decisive from now on, so that this generation may enjoy the benefits."

Much complaint was registered during the year by citizens of Quincy and other adjacent municipalities over the discharge of sewage particularly from the Moon Island Outlet of the Boston Main Drainage Works into Boston Harbor, and late in the year a bill was filed with the Legislature which would require the city of Boston to provide a system of sewage treatment and disposal. This bill, Senate 216, is now before the Legislature.

Shellfish

During the past year the Department in accordance with its duties under Chapter 130 of the General Laws, as amended, has continued to examine certain waters and flats along the coastal areas of Massachusetts from which shellfish are taken. As a result of these examinations restrictions were placed on the taking of shellfish from Mount Hope Bay in the vicinity of Fall River, Somerset and Swansea, and approval was withdrawn on the taking of shellfish for purification purposes from three areas in the vicinity of the Calf Pasture Pumping Station in Boston Harbor. The restrictions were removed from portions of Hyannis and Cohasset harbors, the removal of the restrictions at Hyannis being practicable because of the removal of sewage in the new sewerage system at Hyannis. In addition, the Department has approved for the taking of shellfish for treatment purposes:—

Sixteen areas in Boston Harbor.
Parts of Clark's Cove in New Bedford and Dartmouth.
Parts of Mount Hope Bay in Fall River and Somerset.
Parts of Acushnet River in New Bedford and Fairhaven.
Parts of the Saugus and Pines rivers in Lynn, Saugus and Revere.

Approval has been requested for the removal of the restrictions on Johnson's Creek in Wareham and certain areas in Mount Hope Bay but after examinations the Department has found that these areas are too seriously polluted to permit the removal of the shellfish restrictions. Requests also have been made for the approval of certain additional areas for the taking of shellfish for treatment purposes particularly in the vicinity of Fall River but, in these instances, the pollution has been found to be too serious to permit approval.

During the year representatives of the Department made 1,496 examinations of shellfish-handling establishments as to sanitary conditions. Of these examinations 413 were made at the request of the Supervisor of Marine Fisheries and reports were sent to him promptly in regard to these plants in order that the necessary certificates might be issued. The municipalities in which the establishments are located and the number of establishments in each are shown in the following table:

City or Town	*No. of Shellfish Establishments*	*City or Town*	*No. of Shellfish Establishments*
Amesbury	1	Lenox	1
Arlington	2	Lexington	1
Attleboro	1	Lynn	7
Ayer	1	Malden	3
Barnstable	12	Manchester	2
Boston	60	Marblehead	4
Bourne	6	Marion	3
Braintree	1	Marshfield	1
Brewster	1	Mattapoisett	1
Brockton	6	Medford	2
Brookline	8	Melrose	1
Byfield	1	Middleborough	1
Cambridge	5	Milford	1
Chatham	4	Milton	1
Chelsea	3	Nantucket	17
Cohasset	1	Natick	1
Dartmouth	3	New Bedford	25
Dedham	1	Newbury	3
Dennis	2	Newburyport	7
Duxbury	6	Newton	10
Eastham	2	North Adams	4
Edgartown	5	Norwood	1
Essex	11	Oak Bluffs	4
Everett	2	Orleans	9
Fairhaven	10	Pembroke	1
Fall River	2	Pittsfield	3
Falmouth	2	Plymouth	5
Fitchburg	1	Provincetown	5
Framingham	4	Quincy	4
Gloucester	10	Reading	1
Hanover	1	Rehoboth	1
Harwich	2	Revere	5
Holyoke	1	Rockport	2
Hudson	1	Rowley	6
Hull	4	Salem	1
Ipswich	13	Salisbury	6
Kingston	3	Saugus	3

Scituate	1	Watertown	2
Seekonk	2	Webster	1
Somerville	9	Wellesley	2
Springfield	3	Wellfleet	9
Swampscott	2	Westborough	1
Swansea	3	Westfield	2
Taunton	2	Weston	1
Vineyard Haven	3	Westport	1
Truro	1	Whitman	1
Waban	1	Winchester	1
Wakefield	1	Winthrop	2
Waltham	3	Worcester	5
Wareham	2		

Of the above plants, 89 applications for shuckers' certificates were disapproved at the time of the first inspection because of the reasons shown in the following table:

No plant	18
Not operating properly	10
Not properly equipped	23
Closed for season or out of business	34
Did not desire shucking certificate	4

Certain violations of the rules and regulations promulgated by the United States Public Health Service were observed during the year, and under the provisions of General Laws, Chapter 130, Section 73, and after at least one warning, the Commissioner of Public Health requested the Supervisor of Marine Fisheries to revoke and cancel and require the surrender of eight shucking certificates for one or more of the reasons set forth in the following table:

Plant not properly constructed or maintained	4
Floors not properly constructed or maintained	2
Equipment not properly maintained	4
Use of second-hand cans	2
Operating without hot water	4
Material foreign to shucking in plant	3
No records of sources	2
Obtaining shellfish from unapproved sources	1

It is assumed in most instances that the holders of these certificates were given a hearing as provided in Section 73 by the Supervisor of Marine Fisheries or some one designated by him, but representatives of the Department were not requested to be present at any of these hearings.

Seven cases were brought into court for violations of the shellfish law and in all but two instances convictions were obtained. These cases are listed in the following table:

Delivering Sewage-Polluted Clams

Address of Operator	Court	Date	Conviction
Chicopee	Chicopee	October 14	Probation for one year
Revere	Holyoke	October 15	Conviction
Fall River	Fall River	June 16	Not guilty
Revere	South Boston	February 15	Conviction
Revere	*Boston	March 4	Not guilty

Operating an Unsanitary Shucking Establishment

Salisbury	Amesbury	July 23	Conviction

Unlawfully Transporting Shellfish into Massachusetts

Seabrook, N. H.	Amesbury	April 24	Conviction

*Superior Court.

The first six of these operators held certificates issued by the Supervisor of Marine Fisheries and in each instance with the exception of the two operators found not guilty the certificates were revoked. In the New Hampshire case, approval of the New Hampshire certificate was suspended by this Department.

Acting under the provisions of General Laws, Chapter 130, Section 74, the Department has approved 323 certificates received from other states and Canada. This includes 77 certificates issued by the Department of Pensions and National Health of the Canadian government for scallop meat only. Of the remaining 246 certificates, 161 were for shell stock only and 85 for shucked stock. The following table has been prepared to show the number of certificates issued by the various shellfish producing states and the Canadian government and approved by the Department:

Canada	139
Connecticut	7
Maine	11
Maryland	14
New Hampshire	13
New Jersey	3
New York	2
Rhode Island	97
Virginia	37

Of the above 323 certificates, 23 were revoked during the year by the United States Public Health Service and, accordingly, by this Department. In addition, 14 out-of-state dealers were found to be shipping shellfish into Massachusetts whose certificates had not been approved and communications were sent to all of these dealers warning them of their violations of the law.

The Department has continued general supervision of the Newburyport Shellfish Treatment Plant and since February 19, 1937, when the Scituate plant was again placed in operation under the management of the South Shore Products Company, the Department, through one of its representatives, has examined this plant on numerous occasions. Samples have been collected to show the efficiency of treatment, and careful observations have been made of the laboratory control at both of these plants. The following table has been prepared to show the number of barrels of shellfish treated at the Newburyport and Scituate plants during 1937:

Source	*Newburyport*	*Scituate*	*Total*
Beverly	106.2	–	106.2
Boston	184.9	328.1	513.0
Hingham	–	300.8	300.8
Hull	83.3	205.7	289.0
Newburyport	3,878.7	–	3,878.7
Quincy	212.4	495.5	707.9
Salem	815.9	–	815.9
Salisbury	338.0	–	338.0
Saugus	2,078.4	–	2,078.4
Swansea	–	69.7*	69.7
Winthrop	71.6	–	71.6
Total	7,769.4	1,399.8	9,169.2

*Quahaugs.

In the treatment of quahaugs at the Scituate plant the treatment water is kept above 50° F. in order to assure proper feeding.

Special Investigations

During the year 1937 the Department has been required to carry out the following special legislative investigations either by itself or jointly with other State departments. These investigations were as follows:

Chapter 13 of the Resolves of 1937—Improvement of conditions at Mushquashiat Pond in Scituate. Jointly with the Department of Public Works. The report appears as House 264 of 1938.

Chapter 21 of the Resolves of 1937—Relative to dredging and deepening the channel of a part of the Neponset River in the town of Norwood. This report appears as House 241 of 1938.

Chapter 28 of the Resolves of 1937—Relative to means and methods of remedying the pollution of Hardy Pond in Waltham. This report appears as House 263 of 1938.

Chapter 42 of the Resolves of 1937—Relative to the construction of additional sewers in the North and South Metropolitan Sewerage Districts. This investigation was made jointly with the Metropolitan District Commission and the report appears as House 187 of 1938.

Chapter 48 of the Resolves of 1936—Relative to improving the distribution of water and more adequately preventing pollution of the sources of water supply of the Metropolitan Water District. This investigation was carried on jointly with the Metropolitan District Water Supply Commission and the report appears in House 262 of 1938.

Chapter 51 of the Resolves of 1937—Relative to protecting the purity of interstate waters used for drinking purposes. This investigation was carried on jointly with the Secretary of State and the Attorney General and the report appears as House 695 of 1938.

Chapter 60 of the Resolves of 1937—Relative to certain problems in the Merrimack Valley. This investigation was carried on jointly with the Commissioner of Public Utilities, the Commissioner of Public Works, the Commissioner of Conservation and the Chairman of the State Planning Board. The report appears as Senate 100 of 1938.

Chapter 66 of the Resolves of 1937—Relative to an investigation in cooperation with the Works Progress Administration of the sanitary condition of certain rivers within the Commonwealth. The filing of this report was delayed because of a lack of Federal funds for starting the project but the report was filed on February 1, 1938.

Trailer, Overnight and Other Camps

The Engineering Division has continued its program of assisting the authorities of the Civilian Conservation Corps Camps by making bacterial examinations of the various sources of water supply in use at these camps. In addition, an investigation has been made with funds made available through the Federal Social Security Act of overnight and trailer camps in the Cape section of the State. The results of this latter investigation showed a total of 141 camps in Barnstable, Bristol and Plymouth counties with accommodations for about 4,413 persons. This investigation also showed that the facilities for water supply and sewage disposal at camps previously examined have improved considerably since the earlier investigation and that most of the recommendations by the Department have been carried out. The most common objectionable feature at certain of the camps were the disposal of sink drainage upon the surface of the ground, inadequate facilities for the removal of garbage and needed improvements in the water supply and facilities for the disposal of sewage.

The following table summarizes the results of the bacterial examinations of samples of water collected from the Civilian Conservation Corps Camps during the year 1937:

Bacterial Analyses of Water Supplies at C. C. C. Camps—1937

Location of Camp				Bacterial Condition		
U. S. Army No.	Company No.	City or Town	Reservation—(R) State Forest—(S.F.) Gypsy Moth Camp—(G.M.C.)	No. of Samples	Coli-Aerogenes Group (10 cc Portions) Per Cent Positive	Per Cent Negative
11035	2103	Agawam	Robinson Park (R)	7	0	100
4103	167	Andover	Harold Parker (S.F.)	7	0	100
2154-1	120	Becket	October Mountain (S.F.)	13	5	95
11052	1166	Belchertown	(G.M.C.)	5	0	100
11030	1115	Brewster	Nickerson Park (R)	10	4	96
11030	1189	Brewster	Nickerson Park (R)	9	2	98
2147	135	Brimfield	Brimfield (S.F.)	9	0	100
2149	113	Chester	Chester-Blandford (S.F.)	10	4	96
2199	1156	Chicopee	Chicopee Water Supply (R)	5	0	100
11041	1199	Douglas	Douglas (S.F.)	19	2	98
2171	1190	Fall River	Fall River Water Supply (R)	6	0	100
11037	105	Freetown	Freetown (S.F.)	3	0	100
4108	110	Freetown	Freetown (S.F.)	10	0	100
2148	1103	Goshen	Conway & D.A.R. (S.F.)	1	0	100
2153	108	Great Barrington	Beartown (S.F.)	9	0	100
11050	1159	Greenfield	(G.M.C.)	12	0	100
11034	127	Hancock	Pittsfield (S.F.)	12	2	98
11047	1167	Heath	Colrain (S.F.)	8	0	100
11029	1173	Holyoke	Mt. Tom (R)	10	0	100
11039	1168	Lenox	October Mt. (S.F.)	11	5	95
2170	1170	Milton	Metropolitan Parks (R)	8	0	100
11049	1176	Montague	(G.M.C.)	7	0	100
2152	196	New Marlborough	Sandisfield (S.F.)	4	0	100
11048	1155	Orange	Warwick (S.F.)	5	0	100
2161	1138	Otis	Otis (S.F.)	7	0	100
2163-1	102	Plymouth	Myles Standish (S.F.)	12	0	100
11028	1149	Saugus	Metropolitan Parks (R)	12	0	100
4106	143	Savoy	Savoy Park (S.F.)	11	16	84
11032	1171	Savoy	Savoy Mt. (S.F.)	13	6	94
11043	1183	Savoy	Mohawk Trail (S.F.)	7	26	74
11038	1139	Townsend	Willard Brook (S.F.)	7	0	100
11036	2105	Upton	Upton (S.F.)	7	0	100
11042	1153	Warwick	Warwick (S.F.)	10	0	100
2145	116	Wendell	Wendell (S.F.)	10	0	100
11051	1174	Westfield	(G.M.G.)	9	38	62
2150	114	Granville	Granville (S.F.)	3	0	100
2143	197	Westminster	Leominster (S.F.)	7	3	97
2198	107	Williamstown	Mt. Greylock (R)	13	8	92

Compacts

Under Chapter 402 of the Acts of 1937 the State Planning Board, by its Chairman, was authorized to enter into and execute on the part of this Commonwealth compacts between the states of Connecticut, New Hampshire, Vermont and Massachusetts relative to flood control in the Connecticut River Valley. A proposed compact in the form specified in the act was ratified by the several states and submitted to Congress where it is awaiting approval. Certain other enabling acts of the Legislature were passed in this connection, viz., Chapter 397 of the Acts of 1937 providing for the acquisition of property to permit the construction of reservoirs; Chapter 441 of the Acts of 1937 relative to the issue of bonds; Chapter 446 also relating to notes and bonds and Chapter 445 of the Acts of 1937 relative to supplementary appropriations for the expenses of the Interstate Compact Commission.

Under Chapter 403 of the Acts of 1937 the State Planning Board was authorized to act as agent of the Commonwealth for the ratification of the flood control compact for the Merrimack River Valley between the states of New Hampshire and Massachusetts. The provisions of this compact were similar in most respects to those of the Connecticut River Valley and this compact also has been ratified by New Hampshire and Massachusetts and is before Congress awaiting its approval. Chapter 423 of the Acts of 1937 provides for the acquisition of property for flood control purposes in the Merrimack River Valley; Chapter 442 relates to the issue of bonds in connection with the Merrimack River Valley Flood Control, and Chapter 446 of the Acts of 1937 also relates to bonds and other forms of written acknowledgment of debt relative to flood control in the Merrimack River Valley.

No compacts were consummated under the provisions of Chapter 278 of the Acts of 1936 which authorizes the State Planning Board to act jointly with commis-

sions or individuals designated by other New England States and New York State in formulating compacts for the development and improvement of natural waterways common to any two or more of the said states but during the year, under the provisions of Chapter 51 of the Resolves of 1937, the Special Commission, consisting of the Commissioner of Public Health, a representative of the Secretary of State and a representative of the Attorney General investigated the need of additional legislation for the purpose of protecting the purity of all waters used as sources of public drinking water supply by states adjoining this Commonwealth with a view to reciprocal action by such adjoining states for the benefit of this Commonwealth. In its report to the Legislature, which has been published as House 695 of 1938, the Special Commission stated that the State Planning Board had been vested with broad powers to negotiate compacts in behalf of this State with the other New England States and the State of New York dealing with the elimination of pollution in connection with the development and improvement of natural waterways flowing through or situated within the boundaries of any of the said states, and it would appear that no additional legislation is necessary in the matter of protecting water supplies in neighboring states.

Ground Water Conditions of Parts of Middlesex, Worcester and Norfolk Counties in the Buried Valleys of the Pre-Glacial Merrimack, Sudbury and Charles Rivers

During the year it became necessary that the Division secure the services of a Consulting Geologist in the matter of ground water supplies in the easterly part of the State because of many erroneous statements relative to certain ground water supplies claimed to have their source in underground rivers. The following report was presented in this regard by Irving B. Crosby, Consulting Geologist:

Introduction

This report is made at the request of Mr. Arthur D. Weston, Chief Engineer of the Massachusetts Department of Public Health. It is based upon study of unpublished geological notes and maps, upon other geological information, and upon records of wells and borings. Some of the well records were supplied by the Department but many had previously been collected by the writer. A very extensive collection of boring data for Greater Boston, and a detailed study of underground conditions had previously been made by the writer. This present investigation has made use of this information about Greater Boston but it extends over a much greater area and has involved the collection of much additional data. The conditions under which this report was made did not permit any field work, but field studies would give much additional information.

The purpose of this report is to outline the conditions controlling ground water supplies and to show insofar as is now possible where the conditions are most favorable for such water supplies and where they are the least favorable. The area covered includes the buried pre-glacial valleys of the Merrimack, Sudbury and Charles Rivers and includes most of the Middlesex County and parts of Worcester and Norfolk Counties. The ground water conditions of Suffolk County are not discussed in detail because the communities use surface water supplies.

Geological Conditions Affecting Ground Water

The geology of this area is very complex and includes the following formations divided according to origin:

Sedimentary Origin	*Igneous Origin*
Roxbury conglomerate	Diabase flows and dikes
Cambridge slate	Ayer granite
Worcester phyllite	Dracut diorite
Chiastolite schist	Andover granite
Harvard conglomerate	Mattapan volcanic complex
Boylston schist	Quartz syenite
Brimfield schist (some limestone)	Blue Hill granite porphyry
Wamsutta formation (conglomerate, etc.)	Quincy granite

Merrimack quartzite	Dedham granodiorite
Paxton quartzite	Newburyport quartz diorite
Oakdale quartzite	Wolfpen tonalite
Braintree slate	Sharon syenite
Marlboro formation (schists)	Salem gabro diorite
Westboro quartzite	Milford granite

Gneisses and schists of undetermined age

All of the sedimentary rocks and some of the igneous rocks have been more or less metamorphosed, and all of these rocks are relatively dense and impervious. In practically all of them water occurs only in cracks, and the amount of water in the rocks depends upon the degree of fracturing. The only rock in which large open passages or caverns might occur is limestone, and although it does exist in some of the schists in this area it is of very small extent and caverns are unknown. Therefore groundwater in the hard rocks is restricted to that in the cracks of the rocks. Since the degree of fracturing of the rocks varies greatly the amount of water which can be obtained from them varies, and unless an area of unusually fractured rock can be located by geological study wells in these rocks are a gamble. Usually such wells will yield sufficient for individual domestic supplies, and sometimes enough for industries or institutions but rarely enough for communities. Practically all the important ground water supplies of eastern Massachusetts come from the overburden and therefore no further consideration will be given in this report to water from the hard rocks.

The overburden of this region consists of glacial drift, or of water sorted sediments originally laid down as glacial drift. These deposits consist of two types: 1 glacial till or boulder clay, commonly called hardpan, which was deposited directly from the ice sheet, and which is a heterogeneous mixture of clay, silt, sand, gravel, cobbles and boulders, or of most of these materials. 2. Deposits of gravel, sand, silt and clay laid down either by streams flowing directly from the melting ice or by later streams which eroded and redeposited the original glacial deposits. Boulder clay is relatively impervious, and although individual supplies are often obtained from it by dug wells, it will not yield large supplies. Large ground water supplies can only be obtained from gravels and the coarser sands.

Boulder clay was deposited as rounded hills, known as drumlins, and as ground moraine, a discontinuous, relatively thin blanket. The boulder clay is generally thicker on the hills and thinner or lacking in the valleys. The valleys are partly filled with outwash deposits of clay, silt, sand or gravel. Since important ground water supplies are found only in sand and gravel and since sand and gravel deposits are thickest and most extensive in deeply filled valleys in the bed rock surface, the location of buried valleys is the first important step in a study of ground water supplies of this region. Although many boring records are available these are insufficient to outline the buried valleys and many more at great expense would be necessary to locate them without geologic aid. However when the existing data are studied in connection with the geology and a knowledge of the physiographic development of the region it becomes possible now to outline many of the buried valleys. The next step is to determine the filling of these valleys and for this existing data is even more inadequate. However, knowing the mode of deposition of these formations it is possible to deduce the approximate conditions in many places. It is in this part of the problem that geologic field work is most essential.

Ground water in this region occurs in the pores of the sediments or the cracks of the rocks and it seeps through the ground extremely slowly. In no case does it flow like a river and to speak of underground rivers in these valleys is incorrect.

The Buried Valleys

The buried valleys of Massachusetts were made before the glacial period when the land stood at least 300 feet higher than at the present and the sea was farther to the east. They were made by stream erosion and although they were widened in some cases by the ice during the glacial period they were probably not deepened much by the ice. These buried valleys are not an unusual phenomenon and are not restricted to this region. Similar buried valleys have been studied by the

writer in all parts of New England and in Quebec and New York and are known elsewhere.

The approximate courses of the known buried valleys are shown on the accompanying map. There are probably many tributary valleys not shown due to lack of any information about them, but it is believed that the general outline of the pre-glacial drainage is shown.

The most prominent buried valley known in eastern Massachusetts enters the Boston Basin from Winchester and curves to the east, passing under the Harbor south of South Boston. This was described by W. O. Crosby in the Charles River Dam Report and was believed to be the valley of the pre-glacial Merrimack River. The present writer has made extensive studies of this and other valleys in the Boston Basin and this valley is now known in considerable detail from Woburn to the Harbor. The greatest known depth in Winchester is near the north end of Aberjona Pond where no rock was reached at 145 feet below sea level. Depths of 200 feet or greater are known in this valley at a number of points in Boston with no assurance that the deepest part has been found. This valley had several important tributaries and it was the master stream of this part of Massachusetts.

The Merrimack River flows over ledge at an elevation of about 90 feet at Pawtucket Falls in Lowell, but 2 miles upstream at the Lowell waterworks rock is at sea level or lower with no certainty that the wells are in the deepest part of the valley. The eastward extension of this buried valley probably did not pass north of Lowell but extended to the southeast, passing through the southwest corner of Lowell and through the northern part of Billerica. Rock is known to be below elevation 15 in the southwest part of Lowell and continuing southeasterly is an extensive area devoid of ledges. In fact a broad pathway free from ledges can be traced to the Aberjona River and thence down to the Mystic Lakes from which a bedrock valley extending out to sea is known as has been described. In East Woburn a boring failed to reach rock at -80 and in North Woburn rock has been found at elevations of -50 or -60 feet with no certainty that these borings are in the deepest part of the buried valley. Between these northernmost deep borings and the southernmost definite information near Lowell is a gap in which we have no satisfactory information. The suggestion is strong, however, that the buried valley of the Merrimack at Lowell is continuous with the deep buried valley in Woburn and Winchester.

The only other reasonable pre-glacial course for the Merrimack would have been easterly, probably through Wilmington and North Reading. Wells at the waterworks at North Wilmington and near the Ipswich River in Reading did not reach rock at approximately 15 feet below sea level. These could be interpreted as indicating a valley leading to the east but they can just as logically be interpreted as being in tributary valleys of a deep valley extending south via the Mystic Lakes to Boston Harbor. There is insufficient subsurface information to the east to permit a positive decision as to which course the old Merrimack followed but the course to Boston appears most probable. If the Merrimack did not continue south into the Boston Basin and the deep valley under the Mystic Lakes was made by a local stream heading in Woburn, there was certainly a very low divide at the head of this stream and therefore there is, in any case, a valley in the bed rock surface filled with sediment, extending from Lowell via Wilmington to Winchester.

In brief, the buried valley of the pre-glacial Merrimack is believed to extend from Lowell via Wilmington, Woburn, Winchester to Boston Harbor, but in any case there is a continuous valley filled with sediments extending from Wilmington to Boston Harbor which is the important thing as regards ground water supplies. For convenience this valley will be referred to as the pre-glacial Merrimack Valley.

The Nashua River has an abnormal course and in pre-glacial times it probably flowed easterly from Ayer in the valley now occupied by Stony Brook. Borings in this valley indicate that this interpretation is probably correct. The Nashua then joined the Merrimack at North Chelmsford and the pre-glacial Concord River probably joined the Merrimack in North Billerica. As will be explained later, the pre-glacial Sudbury was probably not tributary to the Concord. There were probably some tributaries to the Merrimack from the north but the data is not sufficient to outline these. The next large tributary of the pre-glacial Merrimack of which we have evidence was the pre-glacial Charles which joined it in the Boston Basin.

The present course of the Charles River is very abnormal and it is certain that its pre-glacial course was different. Physiographic study indicates that the modern Charles consists of parts of several pre-glacial rivers. The upper part of the Charles River Valley apparently drained southwards into Narragansett Bay and the middle part appears to have drained easterly into the Neponset Valley. Subsurface data are scarce in this area and the buried valleys here cannot be discussed in detail.

Just prior to the glacial period the Charles probably headed in the hills of Dover and flowed northeasterly across Wellesley instead of following its present circuitous course through Dedham. In Wellesley it appears to have been joined by a much larger stream from the northwest. Physiographic study indicates that the Sudbury River formerly flowed southeasterly into Wellesley and borings give strong evidence of this. At the new well by Morses Pond test borings failed to reach rock at elevation 25 and on the northwest shore of Lake Cochichuate a boring showed rock to be at —86. The pre-glacial Sudbury flowed southeasterly to Wellesley where it was joined by the small Charles. The course across Wellesley is uncertain. The pre-glacial stream may have flowed northeasterly parallel to the present location of the railroad or it may have swung farther south and turned north through the eastern part of Wellesley. A small tributary from Dedham joined it. From Newton Upper Falls the old valley is under the present Charles River Valley as far as Allston where the old river joined the pre-glacial Merrimack. It has been thought by some that the Charles River formerly flowed into the Neponset Valley but this was impossible as there is a rock ridge between the two valleys. Many outcrops prove the existence of this ridge of granodiorite. Instead of crossing this ridge of resistant rock the pre-glacial Sudbury-Charles Rivers followed the line of least resistance along a belt of slate from Wellesley via Riverside, Waltham and Watertown to the old Merrimack Valley in Allston.

The course of the pre-glacial Neponset is somewhat uncertain due to lack of subsurface data. It probably flowed through Milton south of its present channel.

The pre-glacial valleys of the Merrimack, Sudbury and Charles Rivers have been outlined. These old valleys are buried under glacial drift from 100 to 250 feet beneath the present surface. The valley filling usually consists of stratified sediments, seldom of boulder clay. These valleys contain the thickest and most extensive deposits of sand and gravel and therefore the most important ground water supplies exist in them.

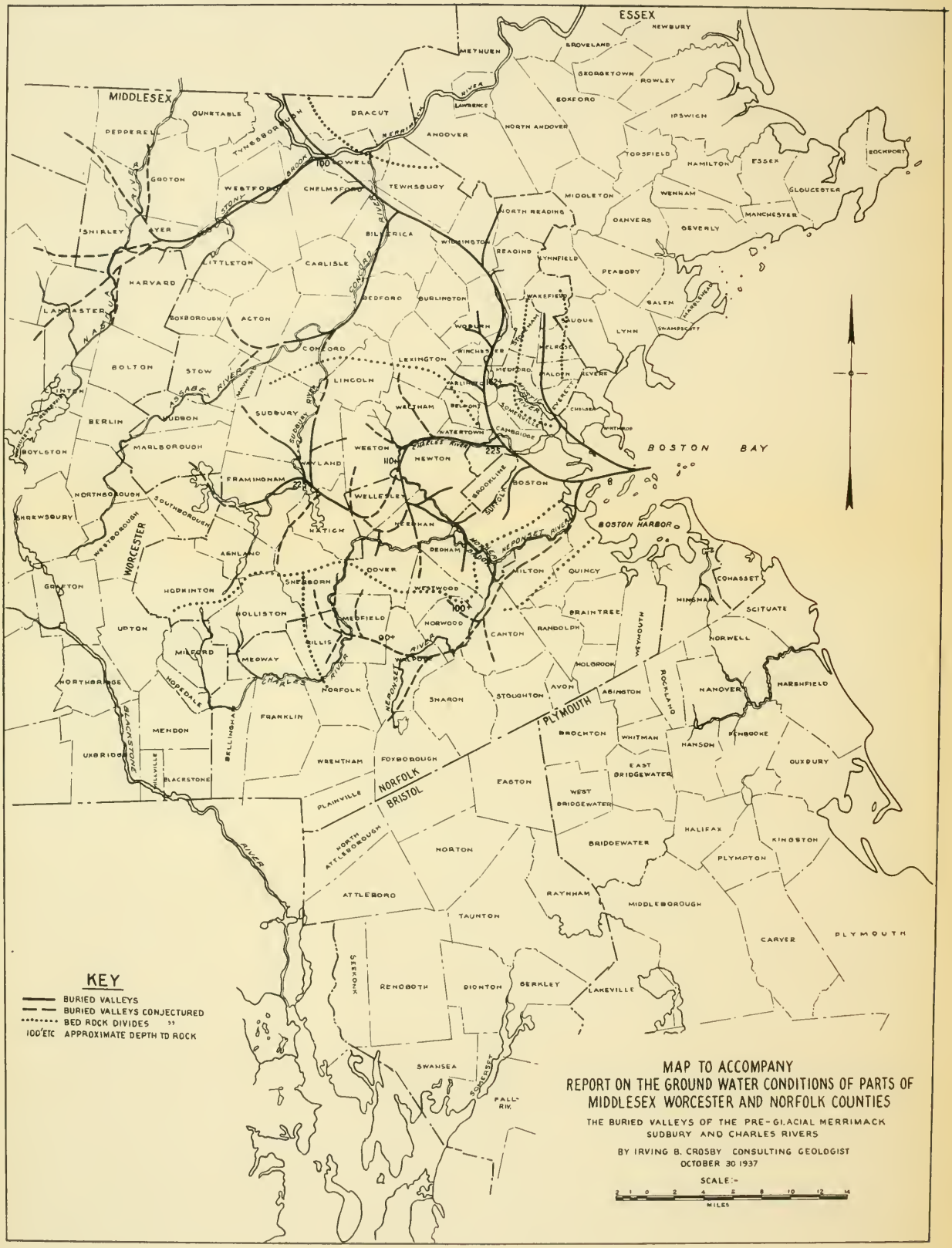
Ground Water Supplies in the Buried Valleys

It has been shown that important ground water supplies in this region are found only in buried valleys and the principal buried valleys have been outlined. The filling of these valleys is extremely variable, consisting in places of fine sediments from which large ground water supplies cannot be obtained and in places of coarse sediments which yield large supplies. The problem in finding a large ground water supply in these valleys is to locate areas of coarse sand and gravel. This could be done by very extensive test drilling but the amount of drilling necessary can be greatly reduced if a geological investigation is first made and the drilling is guided by the geologist.

Existing information about areas of coarse sand and gravel in these valleys is very scanty. However, important existing ground water supplies will be outlined and an attempt made to indicate some of the most favorable areas for further investigation.

The Buried Merrimack Valley

The water supply of Lowell is obtained from numerous wells along the Merrimack River above the city. These wells are in the buried valley of the pre-glacial river. This valley coincides with the present valley above this point. These wells tap the underground flow of this valley and draw water from a large area. The Cook and Hydraulic well fields, formerly used by Lowell, are in the buried valley south of the city. The wells of the Chelmsford water supply along River Meadow Brook are in a buried valley which was tributary to the old Merrimack. The wells of the Billerica supply are in the buried valley of the Concord near its junction with the


ESSEX
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WORCESTER
NORFOLK
PLYMOUTH
BRISTOL
BOSTON BAY
BOSTON HARBOR
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BURIED VALLEYS CONJECTURED
BED ROCK DIVIDES "
100'ETC APPROXIMATE DEPTH TO ROCK
MAP TO ACCOMPANY
REPORT ON THE GROUND WATER CONDITIONS OF PARTS OF
MIDDLESEX WORCESTER AND NORFOLK COUNTIES
THE BURIED VALLEYS OF THE PRE-GLACIAL MERRIMACK
SUDBURY AND CHARLES RIVERS
BY IRVING B. CROSBY CONSULTING GEOLOGIST
OCTOBER 30 1937
SCALE:-
MILES

old Merrimack. The wells of the Wilmington water supply appear to be in the buried valley of a tributary. From Billerica to Woburn there is no information about the nature of the filling of the old Merrimack valley and there may be areas of fine sediments. Other successful wells are probably possible however. In Woburn and Winchester there are many successful wells in this buried valley and also areas of fine sediments where good wells are not possible. The wells of the Woburn Water Supply about Horn Pond are at the west side of this valley at the entrance of a small tributary valley. It is probable that much more ground water can be taken from the buried valley of the pre-glacial Merrimack without exceeding the safe yield.

Two large tributary valleys deserve mention. As has been described Stony Brook marks the course of the pre-glacial Nashua from Ayer to Lowell. The valley is deeply filled with sediments and wells indicate that at least part of this filling consists of sand and gravel. The water supplies of North Chelmsford and Westford are from wells in this valley and the wells of the Ayer water supply are near where this valley leaves the present course of the Nashua River. It is improbable that the safe yield of this valley is approached. The other tributary valley is the Concord which joined the pre-glacial Merrimack in Billerica. The wells of the Billerica water supply are near the junction of this valley with the old Merrimack. It is possible that other successful wells could be located farther up the Concord Valley, but there is evidence that it is filled, at least in part, with very fine sediments.

Ground Water in the Sudbury-Charles Valleys

The Sudbury River formerly joined the Charles as has been explained. The wells of the Wayland water supply are in that part of the valley which drained to the south. They show that the valley is here filled with sand and gravel with some beds of finer material. A branch of this stream came from the town of Sudbury and there are wells in that branch valley. The new well by Morses Pond in Wellesley is in this pre-glacial valley and it probably has tributary to it the ground water of a much larger area than the surface drainage. The New Needham well is in the valley of a tributary stream which flowed north from Dover. The old Wellesley wells near Cedar Street and Wellesley Avenue are in the valley of a tributary which drained north through Needham to the pre-glacial Sudbury-Charles River. The Newton and Brookline wells are in the buried valley of a tributary which flowed north from Dedham into the pre-glacial Sudbury-Charles near Newton Upper Falls. The wells of the Waltham water supply are also in the Charles Valley.

There is thus evidence that in many places the buried valleys of the pre-glacial Sudbury-Charles River and its tributaries are filled with coarse sand or gravel. In other places, as at Riverside the filling is fine and good wells are not possible. It is probable, however, that there are opportunities for other successful wells in these buried valleys and that the safe yield of these valleys has not been reached.

The middle part of the Charles River formerly drained east into the Neponset as has been explained. The wells in Medfield and Millis are in branches of this buried valley. The Norwood water supply comes from wells in a tributary valley of the Neponset. It is possible that additional ground water supplies could be obtained in the buried valleys of the pre-glacial Middle Charles-Neponset system.

Conclusions

The important ground water supplies of northeastern Massachusetts are in deposits of sand or gravel in buried valleys. Some of the most important buried valleys are known and are approximately outlined in this report. Much less is known about the location of deposits of coarse sand or gravel in these valleys and geologic field work is essential to the economic location of ground water supplies. This report indicates where additional ground water supplies are possible and where further investigations should be concentrated. Studies such as this make it possible to determine approximately the tributary underground drainage area of a ground water basin and to estimate the approximate amount of ground water available.

Additional ground water supplies can probably be obtained in the buried valley

of the pre-glacial Merrimack River and its tributary valleys between Woburn and Lowell and also in the buried valley of the pre-glacial Nashua in the present valley of Stony Brook. In the valley of the pre-glacial Sudbury-Charles additional supplies appear possible in the western part of Wellesley and in the communities north and west of Wellesley.

Ohio Flood

On January 29, 1937, in accordance with the request of the Surgeon General of the United States Public Health Service and with the approval of His Excellency the Governor, the services of Gail P. Edwards, Laboratory Co-ordinator, Ernest J. Sullivan, Assistant Engineer, Arthur V. Harrington, Assistant Engineer, and John F. McVey, Jr., Junior Sanitary Engineer, were loaned to the Public Health Service for work in the Ohio River Valley. In this connection Dr. Edwards was made assistant to Senior Sanitary Engineer Crohurst of the United States Public Health Service at Columbus, Ohio, in the co-ordination of all work of the Federal Public Health Authorities in the State of Ohio. Mr. Sullivan was in charge of reconditioning the water supply systems at Lawrenceburg, Aurora and Evansville, Indiana. Mr. Harrington was in charge of matters of sanitation in Lewis County, Kentucky, with headquarters at Vanceburg. Mr. McVey was in charge of rehabilitation of the water supply system at New Albany, Indiana, and later assisted at Evansville.

Under date of February 17, 1937, the Division received the following letter of appreciation from H. R. Crohurst, Senior Sanitary Engineer with the United States Public Health Service, for the services of these men:

"Please permit me to express my appreciation of the services rendered by the Sanitary Engineers of the Massachusetts State Department of Public Health sent by you to assist in the flooded areas of the Ohio River, namely Messrs. Gail P. Edwards, A. V. Harrington, John F. McVey, and Ernest J. Sullivan.

"While the services of all of these men and their equipment were not required in Ohio where I was detailed to cooperate with the Ohio State Department of Health as U. S. Public Health Service representative, they were sent to points in Kentucky and Indiana where conditions were much more critical, and where I know their services were of exceptional value in connection with public water supplies and sanitary procedures in general.

"Through you, I should like to express my appreciation of the services rendered by Mr. Gail P. Edwards, who was associated with me in Columbus and acted as my assistant during the entire period of the emergency in Ohio. Being the only Public Health Service officer detailed to Columbus, Mr. Edwards' assistance, counsel and suggestions and the fact that he was available for administrative assistance when it was necessary for me to be away from Columbus, were of immeasurable value to me during the flood emergency.

"Permit me again to express my appreciation to you as Chief Engineer of the State Department of Public Health for making the services of these men available during the emergency, and through you to these men personally my thanks for the services rendered by them during the flood emergency in Ohio, Kentucky and Indiana."

Cross Connections

During the year 1937 an extensive investigation was made of piping conditions in industrial plants so far as they relate to cross connections between fire and industrial water supplies and supplies used for drinking. Of a total of 901 industrial plants examined, conditions were found to be satisfactory at 385 of this number, and unsatisfactory at 516, or 57.3 per cent of those examined. New double check valve installations have been made at 103 plants. When the Division is advised that conditions have been changed in accordance with the Department's recommendations, it is the practice for an engineer to re-examine the plant. Such re-examinations have been carried out as rapidly as possible but, as the force available for this work in connection with cross connection studies has been limited to two engineers, there has been some delay in carrying out the work contemplated.

In addition to the usual industrial plant examinations, a special study also has

been made of the cross connection conditions in certain State institutions and public buildings.

As a part of the work of the Division relative to cross connections, a pamphlet has been published entitled *"Suggested Double Check Valve Equipment for Fire-Service and Industrial Supply Connections."*

Under date of February 9, 1937, the Department adopted the following rules and regulations relative to cross connections:

Rule 1. After December 31, 1937, no physical connection between the distribution system of a public water supply, the water of which is used for drinking and/or domestic and/or culinary purposes, and that of any other water supply shall be permitted, unless such other water supply is approved by the Department of Public Health as being of safe sanitary quality and the connection of both supplies is approved by the Department of Public Health.

No officer, board, corporation or other person or group of persons, owning or having the management or control of any water supply, the water of which is furnished to any municipality or district for drinking and/or domestic and/or culinary purposes, shall supply water to any person, firm or corporation maintaining such a connection.

Provided: Where such physical connection exists on December 1, 1937, the date of discontinuance may be temporarily extended with the permission of the Department of Public Health provided it includes two gate valves with suitable indicators and two check valves with drip cocks, gages for testing, all located in a pit or room having facilities for draining and readily accessible for periodic inspection and overhauling of the equipment, the entire installation and design of which are approved by the Department of Public Health.

Rule 2. If a public water supply, the water of which is used for drinking and/or domestic and/or culinary purposes, is used as an auxiliary supply delivered to a tank also supplied with water from a source with which cross connections are not permitted by Rule 1, such tank shall be subject to the approval of the Department of Public Health and shall be open to atmospheric pressure and the water shall be supplied to the tank above the maximum level of water in the tank. The tank overflow shall be of adequate size to fix definitely the maximum level.

If the water supply is stored in a tank supplied only from a water supply approved by the Department of Public Health for drinking and/or domestic and/or culinary purposes and directly connected to a water supply, also approved by the said Department of Public Health, such tank shall be so constructed as to avoid any possible contamination of the water in the tank and shall be subject to the approval of the Department of Public Health.

The results of the Department's investigation in the matter of cross connections during the year 1937 are shown in the following table:

Cross Connection Summary

Counties	Barnstable	Berkshire	Bristol	Essex	Franklin	Hampden	Hampshire	Middlesex	Norfolk	Plymouth	Suffolk	Worcester	*Total
Fire Supplies													
Single Check Valves													
Normal Closed Gates						1							1
Normal Open Gates						1		1					2
Gates with By-Pass												2	2
Valves Buried		3	2	2		5	2	6	4	1		11	36
Valves Accessible		6		8	5	2	5	12	2		1	14	55
Periodic Tests		6		6	1	2	3	5	2		1	7	33
No Tests		3	2	4	4	5	4	13	4	1		18	58
Double Check Valves													
Valves Buried		1		1									2
Valves Accessible		24	72	31	5	23	6	18	11	1		16	207
Periodic Tests		24	72	31	5	22	6	13	8	1		16	198
No Tests		1		1		1		5	3				11
Industrial Supplies													
Boiler Feed		16	28	33	5	25	14	29	21	3	2	35	211
Mill Use	1	9	43	37	3	13	2	36	19	7	3	58	231
Process Work	1	16	14	40	3	15	2	27	12	4		16	150
Condensers			7	11		1		13			3		35
Priming		3	16	5		2		7	1			6	40
Drinking Supply with Other Potable	1	7	8	6	5	8	1	11	3	4	1	2	57
Drinking Supply from Fire Service		4				3		1				1	9
Non-Potable Water in Sinks		1		2									3
													1,341

*Dukes and Nantucket Counties not examined in 1937.

Engineering Work at State Institutions

This Division has prepared plans and has carried on certain construction work in connection with water supplies, sewage disposal and other matters at various State institutions as shown in the following table:

Belchertown State School	Plans for new sewage disposal works. Contract about to be let.
Forest Hills Laboratory	Plans have been prepared with estimates of cost for roadway.
Lakeville State Sanatorium	Plans for the construction of new settling tanks and sludge beds.
Medfield State Hospital	Engineering study of sewerage needs and preparation of plans for additional disposal works. Measurements of water consumption and sewage flow.
North Reading State Sanatorium	Plans for and installation of new chlorinating equipment on the effluent line and for improvements in the dosing tank at the sewage treatment plant. Supervision of the installation of a connection to the public water supply mains of the town of North Reading. Investigation with a view to the installation of an annunciator alarm system for fire protection.
Pondville Hospital	Plans for and supervision of construction of additional sand filters and reconstruction of settling tanks. Also reconstruction of certain sewers. Roadway and parking place were constructed. Study of the plumbing system with a view to discovery of cross connections.

Rutland State Sanatorium . .	Plans for removing sewage from certain groups of buildings into the main sewer. Supervision of the installation of a connecting loop of 6-inch main for fire protection.
Shirley, Industrial School for Boys	Supervision of the installation of test wells.
Westborough State Hospital .	Plans for and supervision of reconstruction of sewage filter beds.
Westfield State Sanatorium .	Plans for and the supervision of the reconstruction of a portion of the main sewer, sludge beds and effluent drain. Plans have been prepared with estimates of cost for roadway. Supervision of the construction of improvements to the water supply system including the erection of an elevated tank and its foundations, the installation of service pipes to connect the new buildings with the 10-inch water main of the city of Westfield, the installation of test wells and new tubular wells and the installation of new cast-iron suction mains for the tubular well system. Investigation with a view to the installation of an annunciator alarm system for fire protection.

Institutions of Department of Correction

State Farm, Bridgewater . .	Study of plumbing conditions with reference to cross connections.
State Prison, Charlestown	
Massachusetts Reformatory, Concord	
Reformatory for Women, Framingham	
Norfolk Prison Colony	

Federal Projects

Much time has been given to the general supervision of the Federal Works Progress Administration projects on field surveys and reports relative to the pollution of streams and to sewerage and sewage disposal systems as carried on by Project No. 13,683 sponsored by the Department, and the Division has spent a considerable amount of time during the past year on projects of the Works Progress Administration and to a limited extent in connection with projects of the Federal Public Works Administration. The Department has advised relative to Federal projects from time to time and a summary of the advice of the Department relative to the projects follows:

Federal Projects Considered by the Massachusetts Department of Public Health in 1937

Town	Federal Classification	Description of Project	Action of Department
Arlington	W.P.A.	Drainage system to culvert under the Boston & Maine Railroad.	Endorsed without passing on engineering details.
Billerica	W.P.A.	Proposed Bathing Beach on Shawsheen River.	Pinehurst Park Section recommended as site of beach.
Cambridge	W.P.A.	Improvement of Cambridge Water Supply Basin.	Letter suggesting project U. S. Public Health Service.
Cotuit Fire District	P.W.A.	New Water Works System.	Approved.
Harwich	P.W.A.	New Water Works System.	Approved.
Lowell	P.W.A.	New Gravel Packed Wells.	Approved.
Ludlow	W.P.A.	Combined sewer.	Endorsed on condition that previous corrections of plans be complied with.
Ludlow	W.P.A.	Request for examination of plans for proposed sewers and sewage treatment.	Recommendation of adoption of plans with modifications.
Merrimac	W.P.A.	Examination of two springs used by W.P.A. workers.	Water safe but in danger of pollution. Prevention advised.
Pittsfield	W.P.A.	Storm water drain, manholes, and catch basins in and adjoining Pembroke Avenue.	Endorsed without passing on engineering details.
Wrentham	W.P.A.	Cleaning brook in Sheldonville to Rhode Island line.	Communication to Department of Public Health at Providence.
Wrentham	W.P.A.	Cleaning brook in Sheldonville to Rhode Island line.	Communication to State Reclamation Board.

Examination of Bathing Places

The Department advised relative to the following existing or proposed bathing places during 1937:

Agawam	Miller Brook
Amesbury	Powow River at Camp Powow
Arlington	Arlington Heights Reservoir
Arlington	Spy Pond
Arlington	Mystic Lake
Ashland	Swimming pool at Workmen's Circle Club
Billerica	Concord River at Camp Naomi
Billerica	Shawsheen River near Pinehurst Park
Boston	Charles River
Braintree	Little Pond or Sunset Lake
Cambridge	Charles River
Chester	Westfield River near Camp Brookside Lodge
Chesterfield	Artificial pond at Boy Scout Camp
Dracut	Swimming pool in Kernwood section
Everett	Estuary of Malden River
Grafton	Lake Ripple or Goddard Pond
Grafton	Silver Lake
Halifax	Monponset Pond at Camp Ousamequin
Holden	Eagle Lake
Huntington	Norwich Lake at Camp Norwich
Ipswich	Hood's Pond at Girl Scout Camp
Lancaster	Bartlett's Pond
Longmeadow	Public swimming pool at Cooley Brook
Lynn	Boys' Club swimming pool
Malden	Wading pool at John M. Devir Memorial Park
Mansfield	Wading River at Girl Scout Camp
Marblehead	Swimming pool at Corinthian Yacht Club

Marshfield	North River at Camp Wy-Sibo
Medford	Mystic River at various points in Medford
Natick	None Such Pond at Camp Mary Day
Needham	Rosemary Lake
Newbury	Swimming pool supplied from Parker River
Newton	Charles River
Northampton	Roberts Meadow Brook
North Andover	Berry Pond
Otis	Artificial pond on Farmington River
Quincy	Black Creek
Swansea	Mount Hope Bay
Revere	Revere Beach
Rockland	Studley's or Reed's Pond
Rockport	Old Garden Beach
Rowley	Mill Brook
Russell	Woronoake Lake
Sandwich	Spectacle Pond
Sandwich	Triangle Pond
Sharon	Massapoag Pond at Camp Gannett
Somerset	Taunton River near Pottersville
Somerville	Mystic River
Southbridge	Carpenter's Pond
Southbridge	Williams Pond on McKinstry Brook
Southbridge	Quinebaug River at pond of Ames Worsted Co.
Southbridge	Nuisance Brook
Springfield	Lake Lorraine
Springfield	Watershop Pond
Sturbridge	Cedar Lake at Girl Scout Camp
Sudbury	Cold Brook at Camp Dilijan
Sudbury	Bathing pool on Dudley Brook
Waltham	Charles River
Ware	Swimming pool supplied from Muddy Brook
Watertown	Charles River
Wayland	Baldwin Pond
West Boylston	Ice pond
Winchester	Mystic Lake
Winchester	Wedge Pond at Palmer Beach
Winthrop	Winthrop Beach

In connection with the examination of these bathing places it became necessary to recommend during the year against the use of practically all of the Mystic River in Medford and Somerville for public bathing because of the overflow of sewage into this stream due in part to the construction of the new North Metropolitan Relief Sewer. The examinations of the bathing places along the Charles River Basin have shown an increase in pollution and if certain of these bathing places along the shores of the basin are to be continued in use the domestic sewage now overflowing into the basin should be removed. Legislation for this purpose has already been proposed.

Personnel in the Engineering Division, Water and Sewage Laboratories and the Lawrence Experiment Station

During the year 1937 the following personnel were employed in the Engineering Division, the Water and Sewage Laboratories and the Lawrence Experiment Station of the Department of Public Health:

Water Supply and Sewerage (Under Regular Appropriations)

Permanent

Engineers	17
Chemists	12
Mechanical Handyman	1

Laboratory Assistant	1	
Laborer	1	
Laboratory Helper (Part Time)	1	
Clerks and Stenographers		
Engineering Division	11	
Laboratory	4	
Laboratory Co-ordinator	1	
Shellfish Inspector	1	
Messenger	1	
	51 persons	(full time) (15,402 days)
Temporary		
Engineers	1,033 days*	
Chemists	823 days*	
Clerks and Stenographers	553 days*	
Messenger	21 days*	
	2,430 days*	

Federal Social Security Act (U. S. Public Health Service Funds)

Permanent		
Engineers	6	
Chemists	1	
Clerks and Stenographers	3	
	10 persons	(3,020 days)
Temporary		
Engineers	334 days*	
Chemists	308 days*	
Clerks and Stenographers	44 days*	
	686 days*	

* Man days on basis of 302 days per year.

Water and Sewage Laboratories and Lawrence Experiment Station

A large amount of analytical and research work concerning problems of water supply, water purification, sewage and sewage disposal, treatment of industrial wastes, the condition of rivers and shellfish areas, and allied subjects was carried on during the year 1937 by the Water and Sewage Laboratories and the Lawrence Experiment Station. Many chemical analyses and bacterial examinations were necessitated in connection with certain resolves of the legislature, and the demands of Federal projects also increased the work.

Water and Sewage Laboratories

In carrying out the work of these laboratories during the year, 9,292 chemical analyses and 3,620 microscopical examinations were made.

Some of the special work carried out was as follows:—

Mineral analyses were made on the water supplies of Andover and Chatham and from a private well in Bellingham.

Examinations of three samples of rust eradicators showed that two consisted chiefly of sodium silicate and one of a solution containing hydrochloric acid to which had been added an organic inhibitor.

An analysis of a boiler scale showed it to contain appreciable amounts of zinc oxide with smaller quantities of the oxides of iron, aluminum and calcium, and silica. A sample of deposit removed from the inside of a pipe proved to be the result of corrosion as it contained a large amount of iron oxide and only a small percentage of volatile matter, together with some silica.

A study relative to the death of fish contained in aquaria and exhibited by the Massachusetts State Fish and Game Commission in one of the cities of the State showed that the water supplied to the aquaria was entirely satisfactory for the support of fish life. No clue was obtained as to the contributory factors causing the death of the fish.

A rather extensive series of analyses was made for the presence of rubber in several waste products from a rubber factory, the wastes of which were being discharged into a municipal sewerage system. Analyses to determine the presence of rubber also were made on the municipal sewage and on the deposits on the rock removed from various depths of the municipal trickling filters. The results of these analyses showed definitely that the discharge of these wastes resulted in deposits in the trickling filters.

A series of bacterial experiments was made to determine the alleged purifying properties of certain samples of metaphoric rock (reported by the United States Bureau of Agriculture as Amphibolite) when allowed to stand in contact with a polluted drinking water for one-half hour. There was no indication from the results obtained that this rock possessed any purifying properties.

A microscopical examination of a sample of scum collected from the surface of the slow sand filters of one of the cities in the State showed it to consist of an algal growth and not of deposits of paper pulp as suggested by a petitioner.

At the request of the authorities of the town of Swampscott, an examination was made of the mud in a trench where there was considerable odor. The examination showed that a sample of the mud contained a considerable amount of volatile matter, together with specimens of Anguillula worms. The odor was probably due to decomposing organic matter.

Relative to the disposal of an industrial waste in a municipal sewerage system, it was found that the addition of an amount of acid, equivalent to that which a manufacturing plant was planning to discharge into the sewers, changed the hydrogen ion concentration of the sewage from 7.2 to 3.4 and the total alkalinity from 310 parts per million to an acidity of 30 parts per million.

A number of experiments were made to show the effect of the addition of copper sulphate to fresh, brackish and salt waters. The results showed that, with the addition of the same amount of copper sulphate in each instance, the amount of copper in solution and in suspension was much less for brackish and salt water than for fresh water.

Experiments having to do with the de-aeration of water by means of a partial vacuum, showed that satisfactory de-aeration can not be obtained by means of a partial vacuum alone but that a partial vacuum with agitation of the water is more efficient in removing dissolved oxygen. It was found that a partial vacuum alone was moderately successful in removing carbonic acid from the water but that a partial vacuum plus agitation of the water was more effective.

An extended experiment, to show the effect of galvanic action when dissimilar metals are brought together, has been started and involves the use of nine different kinds of service pipe in common use today, using two pipes at a time,—thirty-six combinations in all. The pipes are immersed in a ground water before and after corrective treatment and in a surface water before and after treatment through a rapid sand filter. The results of this experiment should answer some questions concerning the subject of galvanism through the use of an admixture of metals in the make-up of house plumbing.

The following table gives a summary of the analytical work carried on in the Water and Sewage Laboratories of this Division during the year 1937:—

Samples from public water supplies:	
Surface waters	2,535
Ground waters	1,680
Special samples:	
Surface waters	536
Ground waters	899
Samples from rivers	1,663
Samples from sewerage systems and sewage disposal works	1,641
Samples of wastes and effluents from factories	103
Miscellaneous samples (partial analyses)	235
Microscopical analyses	3,620

Lawrence Experiment Station

Regular Work of the Experiment Station

During 1937 many examinations of rivers, water supplies, swimming pools, and water filtration plants have been made. Results have been reported on experiments concerning sewage and industrial waste disposal, water purification, chlorination, and the condition of water supplies and swimming pools.

Biochemical oxygen demand (B.O.D.) determinations have been made on industrial wastes and on samples from the Merrimack River.

The operation of the shellfish purification plant at Newburyport has received the oversight of the Experiment Station and has been checked by the analyses of frequent samples. A bacteriologist from the Station was in court six times in connection with prosecutions for the sale of polluted shellfish and once concerning a stream pollution case. In addition, the Chief of Laboratory consulted with those in charge of the following laboratories with a view to coordinating the general laboratory work of these laboratories with that of this Division:—

Metropolitan Water District
Fall River Health Department
Brockton Sewage Works
Lowell Water Department
Newburyport Shellfish Plant

A large amount of work was done in testing the various methods of determining pollution of shellfish and copies of the results were forwarded to the Shellfish Standards Committee of the Laboratory Section of the American Public Health Association. The Experiment Station cooperated with the Winchester Water Department in treating a newly cleaned water main with sodium silicate but this treatment was not successful. Further work in an attempt to coat the pipe with a deposit of calcium carbonate is still in progress.

The superintendent of water works and the proposed operator of the new rapid sand filter at Athol were given instruction in bacterial and chemical methods for about a week.

A study of the wastes from a company manufacturing rubber products included

experiments to show the clogging effect of the latex wastes on a trickling filter, experiments on coagulating the latex, and filtration of the liquor after removal of the latex. The results showed that while latex wastes in sewage tend to clog trickling filters, these wastes after coagulation and removal of latex could be discharged to the sewer and treated on the town filters without difficulty.

Tests made on the sewage overflowing into the Aberjona River in Woburn showed that the greatest removal of suspended solids and B.O.D. occurred during the first half hour of sedimentation.

Tests on a tannery sludge showed this sludge would not digest with evolution of gas as sewage sludge does.

Experiments with digester liquors from a bleachery showed that, after carbonating with flue gas to convert caustic and carbonate alkalinity to bicarbonate alkalinity, bacterial growth became active and a B.O.D. reduction of about 40 per cent could be obtained by filtration through 10 feet of crushed stone at a rate of 1,000,000 gallons per acre daily. By lagooning for several weeks, carbonation took place by absorption of carbon dioxide from the air, aided later by bacterial action.

The studies of the methods of operating sand sewage filters and of the comparative efficiencies of sand filters of different depths have been continued, the object of these studies being to make disposal of sewage by sand filtration more efficient and economical.

A study of the effect on sewage disposal of very high rates of operation of trickling filters was made, using two crushed stone filters and one filter of perforated tile. The results showed that there is a tendency for the stone filters to clog because of their failure to unload as does a filter operated at a normal rate. The effluent is very turbid and the purification considerably less than that with filters operated at conventional rates.

Analyses of air from the interior of one of the crushed stone high rate trickling filters have been made weekly to test claims that this type of filter needs artificial aeration at times. During normal operation the air in the filter contained about 15 per cent oxygen but as soon as clogging became noticeable, the percentage dropped to a few tenths of a per cent although never to zero.

Ferric sulphate in amounts insufficient to cause coagulation was added to the sewage applied to a trickling filter. Passage through the filter caused the iron to coagulate. The results of these experiments show that the character of the effluent is improved but there is a tendency for the precipitated iron to clog the filter.

Experiments to determine the effect of the addition of ground garbage to two septic tanks and an Imhoff tank have been continued. Garbage, equal to the suspended solids in the sewage, on the dry basis, has been applied to these tanks without detrimental results.

A considerable amount of laboratory work has been done to determine the minimum amount of chlorine required to remove coli-aerogenes from various water supplies.

Work Under the Federal Social Security Act

Work on the filtration of Merrimack River water consisted in the operation of a complete rapid sand filter about 2 per cent of the size of a conventional unit. The use of different coagulants (alum, ferric sulphate, and ferric chloride), pre-chlorination, and the optimum pH ranges have been investigated. The effluent of the rapid sand filter has been refiltered through secondary slow sand filters. The results show that alum is the best coagulant, and a pH of about 5.5 is the optimum. The bacterial results of the effluent from the rapid sand filters have averaged better than those from the Lawrence slow sand filters. The value of pre-chlorination has not yet been determined. The secondary filters have given little additional bacterial removal.

A circular filter divided into three sectors has been operated as a roughing filter for the Merrimack River water, various sizes of sand and pebbles being used in the different sectors. The results of the operation of this filter have been disappointing because in order to maintain a high rate of filtration, such coarse material had to be used that little purification was obtained.

During the year visitors to the Lawrence Experiment Station included classes from Harvard; Massachusetts Institute of Technology; Lawrence General Hospital; Lawrence Memorial Hospital, Medford; and individuals from England, Argentine, Columbia, Nicaragua, China and Czechoslovakia.

The analytical work carried on at the Experiment Station is summarized in the following table and a resumé of some of the research work is submitted in the following pages:—

Chemical samples from investigations of disposal of domestic sewage, filtration of water, and various rivers	2,108
Chemical samples from investigation of industrial wastes	188
Sand samples	154
Chemical samples in connection with work under Federal Social Security Act	102
Bacterial samples in connection with the regular work of the Department	13,158
Bacterial shellfish samples	475
Bacterial samples in connection with work under Federal Social Security Act	1,727

Treatment of Wastes from a Bleachery

A study was made of the industrial wastes from a plant engaged in bleaching and dyeing cotton cloth which caused injury to fish and serious pollution of the stream into which they were discharged. The type and estimated daily volumes of these wastes are as follows:

Soap kier	2,000 gallons
Peroxide kier	3,000 gallons
Caustic kier	3,000 gallons
Print box washer No. 2	3,800 gallons
Print box washer No. 3	1,800 gallons
Dolly washer, soap wash	2,700 gallons
Dye back soaper	420 gallons

The average total alkalinity of the composite samples of nine lots of the wastes was 1,164 parts per million, mostly in the form of carbonate. The average caustic alkalinity of the peroxide kier waste was 546 parts per million. Two lots of caustic kier liquor averaged 910 parts per million caustic alkalinity and the alkalinity of the other five lots was all carbonate.

A composite of these wastes in dilutions of one to fifty in tap water killed goldfish in two hours. It was found that if all the alkalinity of the wastes was converted to bicarbonate, the goldfish were uninjured.

The alkalinity of the composite wastes was sufficient to nearly sterilize one per cent of sewage added to it but after all the alkalinity was converted to bicarbonate by blowing flue gas through it, bacteria grew readily in numbers as high as 82,000,000 per cubic centimeter.

Two plans have been proposed for treating these wastes: One is by lagooning them during periods of low flow in the river and discharging them gradually at times of high flow; the other provides for carbonation of the waste and filtration through a trickling filter. The results of our experiments show that either plan would be effective in converting the caustic and carbonate alkalinities, which are injurious to fish, to bicarbonate. They also showed that the composite waste exposed to the outdoor air in small tanks, one foot deep, became carbonated in from three to four weeks, carbonation being due partly to absorption of $C0_2$ from the air and partly to the $C0_2$ produced by bacterial action. Converting the carbonate to bicarbonate by blowing flue gas through the waste was found to be a very slow process, being much slower than converting caustic lime in tannery wastes to calcium carbonate.

Carbonated composite waste was applied at a rate of 1,000,000 gallons per acre daily to a small trickling filter (No. 678) constructed of 10 feet in depth of new crushed stone which would pass a 1½-inch screen but be retained by a ¾-inch screen. For the first few days one per cent of sewage was added to the waste. Bacterial growth was established quickly and no more seeding with sewage was

needed. The main object in the operation of this filter was to reduce the B.O.D. of the waste as much as possible. The waste was too strong and too stable to expect very much reduction in organic matter. The appearance of the effluent was very little different from the applied waste but the B.O.D. reduction as accomplished by filtration and sedimentation of the effluent was 40 per cent, leaving a residual 5-day B.O.D. of 731 parts per million.

Treatment of Carbonated Bleachery Waste by Filtration through a Trickling Filter

Average Chemical Analyses

(Parts per Million)

Ammonia			Kjeldahl Nitrogen		Nitrogen as Nitrates	Oxygen Consumed	Alkalinity	Fats	B.O.D.	
	Albuminoid									
Free	Total	In Solution	Total	In Solution					Unsettled	Settled
Carbonated Bleachery Waste (applied to Filter No. 678)										
2.30	23.0	20.0	43	38	–	541	1,164	537	1,211	–
Effluent from Trickling Filter No. 678										
2.96	20.6	19.0	40	37	.286	426	1,354	272	778	731

Average Solids

(Parts per Million)

	Unfiltered			*In Suspension		
	Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed
Carbonated Bleachery Waste .	4,271	2,640	1,631	313	262	51
Effluent from Trickling Filter No. 678	3,604	1,907	1,697	189	139	50

*By Gooch crucible.

Examination of Shellfish

In addition to the usual examinations of shellfish as dug, as offered for sale in markets and from chlorinating plants, comparisons were made between the Standard Method and the Eijkman method of bacterial examination of shellfish and seawaters from areas where various degrees of pollution existed. This work was in connection with a proposed new method of scoring using Escherichia coli, based on the Eijkman technique, as the index of pollution. Determinations of the presence of streptococci were made on the same samples. The results indicate the advisability of retaining the present Standard Methods.

Experiments on the purification of mussels indicated the probability of successful treatment of these shellfish by the same method used for soft-shell clams.

Character of the Sewage Used in Experiments

The sewage used for experimental purposes at the Lawrence Experiment Station is that of the city of Lawrence, which is pumped from the Osgood Street sewer, on the opposite side of the Merrimack River, to the Experiment Station through about 1,850 feet of three-inch pipe. The pump is of the centrifugal type and is capable of pumping about 65 gallons a minute.

In the following tables of average analyses of the sewage used during the year 1937, the term "regular sewage" refers to the sewage as pumped to the Station and the term "settled sewage" refers to this same sewage after it has received some settling in a tank of 1,200 gallons' capacity which is used for supplying all the filters at the Station.

Imhoff Tank No. 545 was designed to receive the output of the old sewage

pump which had a capacity of not more than ten gallons a minute, and all sewage pumped to the Station was passed through it. Since the new pump with a greater capacity was installed in October, 1936, all sewage has been pumped to the 1,200-gallon tank. Twelve hundred gallons of sewage from this tank is passed daily through the Imhoff Tank at a rate of about ten gallons a minute. Two hundred and fifty gallons of the Imhoff tank effluent is applied to an outdoor sand filter, No. 639. The rest is pumped back to the 1,200-gallon tank and all of the sludge from this tank is added to the Imhoff tank. On an average, 3,400 gallons of sewage are pumped daily.

Disposal of Ground Garbage with Sewage

During the past few years there has been a growing interest in the disposal of household garbage through sewerage systems after grinding in apparatus provided for the purpose either in the house or at some central point of collection. Various opinions as to the advantages and disadvantages of such disposal have been expressed and while there seems to be little doubt that garbage can be so disposed of without seriously interfering with sewage treatment processes, it was deemed advisable to carry out some experiments at the Lawrence Experiment Station. These experiments were started in 1936 and, although interrupted by the flood, were continued throughout 1937.

The garbage used has been from the kitchens of members of the staff of the Lawrence Experiment Station and, during the grinding, sewage has been used for flushing instead of water. An average of five analyses of the mixed sewage and garbage showed 20 per cent of dry solids, 1.86 per cent of nitrogen and 23.3 per cent of fats. Of the dry matter, 96.6 per cent was volatile. The bulk of the garbage consisted of the waste portions of fruits and vegetables. The fats varied more than the dry matter or nitrogen, ranging from 12.3 per cent to 48.7 per cent.

Imhoff Tank

The Imhoff Tank, No. 545, operated during the year is made of concrete, 20 feet deep, with a settling compartment 7 feet 4 inches long by one foot wide and has gas vents one foot square at each end. The bottom of the settling compartment has a slope of 45 degrees toward the center where there is a slot opening. The digestion compartment has a capacity of 357 gallons while the settling compartment has a capacity of 715 gallons, giving a theoretical detention period of about one and one-quarter hours during the two hours a day that the sewage is being applied.

Sludge settling out in the 1,200-gallon supply tank, amounting to 403 pounds of dry matter, has been applied to the sludge compartment of the Imhoff tank. In addition, ground garbage equal to 313 pounds of dry matter was added. The solids settling out of the sewage passing through the Imhoff tank amounted to 72 pounds, making a total of 788 pounds of dry solids added to the digestion compartment, while 119 pounds of well digested sludge was drawn from the outlet. The average composition of the dry digested sludge was,—fats, 13.7 per cent; nitrogen, 3.75 per cent; volatile matter, 72.1 per cent. The addition of the ground garbage caused the sludge to rise in the gas vents but there was no indication of any interference with the biological action in the tank.

The average pH of the sewage as pumped was 7.0; after some time in the settling tank it was 6.9; and after passing through the Imhoff tank, it was 6.8. This indicates plainly that there were no acid conditions due to the added garbage. It is very possible that some organic acids were formed during the digestion process, but our experience has shown that such acids are readily fermentable to methane and carbon dioxide.

Average Analyses of Lawrence Sewage

(Parts per Million)

Ammonia			Kjeldahl Nitrogen		Chlorides	Oxygen Consumed	B.O.D.	Fats	Bacteria per Cubic Centimeter 4 Days-20°C.
Free	Albuminoid								
	Total	In Solution	Total	In Solution					
			Regular Sewage						
39.0	11.7	5.49	22	11.	47	76	475	53	4,600,000
			Settled Sewage						
36.0	8.04	4.24	15	8.0	42	45	312	35	2,600,000
			Sewage after passing through Imhoff Tank No. 545						
42.0	6.84	3.62	13	6.7	43	43	303	25	3,200,000

*Average Suspended Solids**

(Parts per Million)

	Total	Loss on Ignition	Fixed
Regular sewage	318	233	85
Settled sewage	153	123	30
Sewage after passing through Imhoff Tank No. 545	127	100	27

* By Gooch crucible.

Septic Tanks

Septic Tanks Nos. 507 and 508 have been operated at the Experiment Station since June, 1920. Tank No. 507 is 4 feet long, 2 feet wide and 40 inches deep, with a sloping bottom and has a capacity of 185 gallons. Tank No. 508 contains two compartments of the same size as Tank No. 507 and has a capacity of 370 gallons. Sewage enters each tank through trapped inlets and discharges through a pipe reaching 15 inches below the surface of the sewage in the tank. A baffle, located one-third of the distance from the inlet to the outlet, reaches to within 8 inches of the bottom of the tank. Tank No. 507 receives practically fresh household sewage and Tank No. 508 receives Lawrence sewage, which is comparatively stale. Both tanks are so operated that theoretically the sewage is held in each for two days; that is, the amount of sewage added daily is equal to one-half the capacity of the tanks, disregarding the effect of the accumulated sludge.

In adding the ground garbage to Septic Tanks Nos. 507 and 508, it was planned to add as much garbage on a dry basis as the tanks received of dry suspended sewage solids. During the year, Septic Tank No. 507 received 94.6 pounds of dry suspended sewage solids and 90.4 pounds of dry garbage solids; Septic Tank No. 508 received 82.4 pounds of dry suspended sewage solids and 91.3 pounds of dry garbage solids. The pH of the sewage applied to Tank No. 507 was 7.5 and of the effluent 6.6; that of the sewage applied to Tank No. 508 was 6.8 and of the effluent, 6.3.

When the tanks were opened at the end of 1936, some sludge was removed, one foot of sludge being left in each compartment. When the tanks were again opened at the end of 1937, the first compartment of Tank No. 507 contained 22 inches of sludge and the first and second compartments of Tank No. 508 contained 13½ inches and 14½ inches, respectively. Calculations showed 137 pounds of dry matter had been destroyed in Tank No. 507 or about 72 per cent of the amount applied during the year; in Tank No. 508, 136 pounds were destroyed, or about 58 per cent of the amount applied during the year. The B.O.D. reduction in the sewage passing through these tanks was 28.7 per cent for Tank No. 507, and 29.6 per cent for Tank No. 508. Some of this reduction was due to the removal of suspended solids, and it is worth noting that there was no increase in the B.O.D. of the effluent, due

to the addition of garbage. The sludge in both tanks at the end of the year was black and inoffensive and of the same general appearance as in other years when no garbage was applied. These results show conclusively that an amount of domestic garbage equal to the suspended solids in the sewage can be digested without any difficulty in properly operated septic tanks.

Operation of Septic Tanks

Average Analyses

(Parts per Million)

Ammonia			Kjeldahl Nitrogen		Chlorides	Oxygen Consumed	Fats	B.O.D.	Bacteria per Cubic Centimeter 4 Days—20°C.
Free	Albuminoid								
	Total	In Solution	Total	In Solution					
Fresh Sewage applied to Closed Septic Tank No. 507									
124.	22.2	8.67	38.	17.	92	123	112	429	2,600,000
Effluent from Closed Septic Tank No. 507									
125.	10.5	6.18	18.	11.	87	66	23	306	2,400,000
Sewage applied to Closed Septic Tank No. 508									
36.	9.11	5.53	16.	9.8	39	54	52	331	2,700,000
Effluent from Closed Septic Tank No. 508									
46.5	5.18	3.24	9.3	6.0	39	38	16	233	1,200,000

*Average Suspended Solids**

(Parts per Million)

	Total	Loss on Ignition	Fixed
Fresh sewage applied to Closed Septic Tank No. 507	518	440	78
Effluent from Closed Septic Tank No. 507	181	155	26
Regular sewage applied to Closed Septic Tank No. 508	226	178	48
Effluent from Closed Septic Tank No. 508	104	78	26

* By Gooch crucible.

Activated Sludge

Experiments on the aeration of sewage have been carried on at the Lawrence Experiment Station continuously since 1911, and descriptions and results of this work have been published in the annual reports of the Department. Activated sludge Tank No. 485, which was started in 1917, is still in operation. It has three compartments in series, 75 inches deep, each holding 230 gallons. The overflow from the last compartment, comprising the purified sewage and considerable sludge, passes through two settling tanks with capacities of 600 and 160 gallons, respectively, allowing three and three-quarter hours' sedimentation. During this time, the activated sludge settles out and is pumped back to the first compartment. The sewage is retained in the aerating compartments about three and one-half hours. Air is applied at the bottom of each compartment through a filtros plate, clamped to the top of an iron box, at a rate approximately 1.15 cubic feet of air per gallon of sewage treated. The amount of sludge retained in the tank was considerably less than the 20 per cent by volume formerly used. Excess sludge, equivalent to 218 pounds of dry material per million gallons of sewage treated, was pumped to waste. This sludge contained, on a dry basis, 66.2 per cent volatile matter, 6.2 per cent

nitrogen and 4.8 per cent fats. The mixture of sludge and aerated sewage entering the settling tank contained an average of 6.0 parts per million dissolved oxygen. The final effluent from the settling tanks has been usually clear and bright, with an average of 51 parts per million suspended solids. In all the time this activated sludge tank has been operated, there has been no trouble from bulking of the sludge. Late in the year, experiments were started to try to cause bulking and then to restore conditions to normal, but sufficient progress has not been made to warrant describing the results.

Operation of Activated Sludge Tank No. 485

Average Analyses

(Parts per Million)

Appearance		Ammonia			Kjeldahl Nitrogen		Chlorides	Nitrogen as—		Oxygen Consumed	B.O.D.	Fats	Bacteria per Cubic Centimeter 4 Days-20° C.
			Albuminoid										
Turbidity	Color	Free	Total	In Solution	Total	In Solution		Nitrates	Nitrites				
Settled Sewage applied to Activated Sludge Tank No. 485													
–	–	36.	8.04	4.24	15.	8.0	42	–	–	45	312	35	2,600,000
Effluent from Activated Sludge Tank No. 485													
10	68	26.8	2.85	2.17	5.0	3.8	43	.72	.35	15	84	–	640,000

*Average Suspended Solids**

(Parts per Million)

	Total	Loss on Ignition	Fixed
Settled sewage applied to Activated Sludge Tank No. 485 . .	153	123	30
Effluent from Activated Sludge Tank No. 485	51	37	14

* By Gooch crucible.

Intermittent Sand Filters

Intermittent sand sewage filters have been operated at the Lawrence Experiment Station since it was established in 1887, 216 having been operated with sewage and many others with various kinds of industrial wastes. During the last six years some of the conditions affecting operation of such filters have been re-studied on an extensive scale. Recently, studies have been made on a number of filters operated at the same time, covering the conditions in question, rather than by a number of filters operated at different times.

Studies of Overdosing

The best method of operating intermittent sand filters is to apply sewage every day or, at the most, every other day, in one dose as rapidly as practicable so as to cover the whole surface of the filter uniformly. If the sewage is applied slowly at one or more points the entire surface will not be covered, some of the air in the sand will not be changed and those sections of the filter receiving the sewage will be operating as continuous instead of intermittent filters. It is unfortunately the practice at some treatment plants to apply the sewage during a few hours in amounts equivalent to several days' supply.

As a result of these studies it has been shown that doubling the dose and flooding a filter every other day is not particularly harmful but the larger doses at longer intervals give progressively poorer results. They also show that a filter of sand of good effective size and uniformity coefficient will stand much more overloading than a filter of poorly graded sand. A good sand has an effective size of from .25 to .35

millimeter and a uniformity coefficient of not over 4.0. An unsuitable sand is one with an effective size below .15 millimeter. Usually sands, as found in Massachusetts filter beds, with a low effective size, have a high uniformity coefficient.

During 1937, a series of seven small filters of a poor grade of sand, similar to the sand in a number of municipal areas, has been operated to show the effect of improper methods of flooding. Four feet of sand of an effective size of .15 millimeter and a uniformity coefficient of 5.6 was used.

Filter No. 643 was operated as a control and was flooded once daily; Filter No. 644 was flooded every two days; Filter No. 645, every three days; Filter No. 646, every four days; Filter No. 647, every five days; Filter No. 648, every six days; and Filter No. 649, every seven days. Each filter received an equal volume of sewage during the year unless the surface remained covered with sewage. During 1937, the intended rate of filtration was 105,600 gallons per acre daily, which is a high rate for filters of poorly graded sand. It was necessary to rake the surface of all the filters three times and to remove an inch of dirty sand. The operation of these filters at near the maximum rate for the grade of sand resulted in some irregularities between the different filters but the results as a whole show the progressively poorer purification as the interval between floodings is increased.

Intermittent Sand Filters.—Effect of Method of Dosing

Average Analyses of Effluents

(Parts per Million)

Filter Number	Number of Days Between Floodings	Effective Size of Sand (Millimeter)	Color	Ammonia		Chlorides	Nitrogen as—		Oxygen Consumed	B.O.D.
				Free	Albuminoid		Nitrates	Nitrites		
Settled sewage	–	–	–	36.	8.04	42	–	–	–	312.
643	1	.15	33	2.90	.548	40	27.5	.15	5.3	4.2
644	2	.15	71	5.44	.986	42	15.6	.95	9.6	5.5
645	3	.15	34	1.54	.610	42	19.7	.88	6.6	7.5
646	4	.15	36	1.70	.610	42	15.2	.93	7.3	6.3
647	5	.15	122	11.1	1.06	44	.78	.13	10.	12.
648	6	.15	181	8.31	1.61	42	3.60	.15	17.	18.
649	7	.15	215	7.26	1.81	42	5.93	.64	15.	14.

Depth of Intermittent Sand Filters

There is no uniformity in the depth of sand of municipal and institutional filtration areas. Where the filter is constructed of the soil in place, the depth is not of much importance from a standpoint of cost but where the sand has to be brought from a distance, the depth is an important consideration.

With this point in view, five filters have been operated during the past three years at the Experiment Station at a rate of about 76,800 gallons per acre daily. They are Nos. 636, 620, 621, 622 and 623 and contain 1, 2, 3, 4 and 5 feet in depth, respectively, of sand of an effective size of .25 millimeter. These filters are located indoors and the results are comparable with what might be expected of outdoor filters during the seven warmer months.

Nitrification has been nearly the same in all except the two shallowest, Nos. 636 and 620 and under the conditions of this experiment there is no advantage in having a depth of sand greater than three feet.

Filters Nos. 1, 4 and 9A located out of doors, were discontinued December 31, 1936, as it was impossible to continue them without rebuilding. The first two had been operated 49 years and the last, 46 years. Filter No. 639, located out of doors, has a depth of two feet of sand of an effective size of .22 millimeter over six inches of graded stone and gravel underdrains and was operated at a rate of 50,000 gallons per acre daily during the year. The average degree of purification of the effluent from this filter is not as great as that of Filter No. 620, which has the same depth of sand because of the lower purification during the winter months.

Intermittent Sand Filters.—Effect of Depth

Average Analyses of Effluents

(Parts per Million)

Filter Number	Depth (Feet)	Effective Size of Sand (Millimeter)	Color	Ammonia		Chlorides	Nitrogen As—		Oxygen Consumed	B.O.D.
				Free	Albuminoid		Nitrates	Nitrites		
Settled sewage	–	–	–	36.	8.04	42	–	–	45.	312.
636	1	.25	40	2.12	1.06	39	16.5	2.19	11.	11.
620	2	.25	35	.889	.885	38	19.3	2.02	21.	5.1
621	3	.25	18	.903	.463	38	28.5	.331	4.6	3.9
622	4	.25	15	1.80	.320	37	26.3	.106	3.1	2.5
623	5	.25	19	.176	.495	39	22.4	.45	4.9	2.9
*639	2	.22	53	8.87	1.68	40	20.6	1.15	14.	30.

*Located outdoors.

Underdrains in Intermittent Sand Filters

All the larger sand filtration areas in the State where the material is found in place are drained through lines of akron pipe laid with gravel-covered open joints.

In all of the sand filters operated at the Experiment Station, underdrains consisting of 6 inches of graded gravel have been provided under the entire area of the filter in addition to akron pipe in the larger filters. If this construction is found to be advantageous, it can be used for all filters where the material is not found in place but must be brought in. In this connection, two filters, Nos. 651 and 652, were started November 1, 1935, and then contained 4 feet in depth of sand with an effective size of .25 millimeter. They are 10 feet long, one foot wide and are intended to represent cross sections of an average municipal filter bed, halfway between lines of underdrains, assuming that the parallel lines of underdrains are 20 feet apart. Filter No. 651 has no underdrains and Filter No. 652 is underlaid by 6 inches of graded stone and gravel. The results of a year's operation show no advantage from underdrains when the filters are constructed of good sand.

At the end of 1936, the sand in these filters was removed and replaced with a poor grade of sand having an effective size of .14 millimeter and a uniformity coefficient of 3.5. The average rate of operation during 1936 was 50,000 gallons per acre daily and in 1937 it was increased to 62,500. Operation in 1937 gave slightly better results for the filter with underdrains but the difference in these results does not seem to warrant the expense of completely underdraining sand filters.

Intermittent Sand Filters.—Effect of Underdrains

Average Analyses of Effluents

(Parts per Million)

Filter Number	Depth (Feet)	Effective Size of Sand (Millimeter)	Underdrains	Color	Ammonia		Chlorides	Nitrogen As—		Oxygen Consumed	B.O.D.
					Free	Albuminoid		Nitrates	Nitrites		
Settled sewage	–	–	–	–	36.	8.04	42	–	–	45.	312.
651	4	.13	No	14	.138	.273	37	23.7	.034	3.0	1.6
652	4	.13	Yes	12	.096	.263	37	25.0	.005	2.8	1.0

Rates of Operation of Intermittent Sand Filters

Filter Number	Gallons per Acre Daily	Per Cent of Time Filter was covered with Sewage
636	76,800	0.
620	76,400	0.5
621	75,600	1.7
622	73,800	3.1
623	74,800	2.5
643	105,600	0.
644	103,800	1.6
645	104,700	.8
646	104,400	1.1
647	96,800	8.2
648	103,000	1.6
649	99,000	5.8

Intermittent Sand Filters.—Average Bacterial Analyses of Effluents

Filter Number	Bacteria per Cubic Centimeter			Coli-Aerogenes Group in 100 c.c.
	4 Days 20°C.	24 Hours—37°C.		
		Total	Red	
Settled sewage	2,560,000	400,000	255,000	127,000,000
636	58,000	2,400	1,600	59,000
620	11,500	1,700	200	150,000
621	7,000	140	70	15,000
622	2,600	35	21	1,400
623	700	50	5	28
643	21,000	3,700	950	41,000
644	46,000	2,300	1,500	62,000
645	27,000	4,500	3,700	50,000
646	47,000	5,400	3,800	80,000
647	49,000	4,900	1,800	69,000
648	25,000	13,000	3,800	66,000
649	33,000	7,300	4,400	190,000
651	680	20	6	190
652	4,100	70	28	1,200
639	244,000	15,000	11,000	1,600,000

Trickling Filters

In 1890, an intermittent filter of coarse gravel was operated at the Experiment Station. This was the forerunner of the present trickling filter and was probably the first filter of this type anywhere. Since then, there has always been a number of these filters in operation at the Experiment Station for the study of various problems.

Four filters, Nos. 452 to 455, inclusive, which have been operated to show the greater efficiency of deeper filters, contain 4, 6, 8 and 10 feet of crushed stone, respectively, that will pass a 1½-inch screen and be retained by a ¾-inch screen. It has been the custom for some time to so adjust their rates of operation that their effluents are of approximately equal quality. On July 1, the rates were changed so that each filter received the same amount of sewage for each cubic foot of stone, the rates being expressed as million gallons per acre foot daily. During the year, all regular analyses of trickling filter effluents have been made on samples of the effluents collected after one hour settling. Suspended solids have been determined on the effluents, both before and after settling.

The analyses show that the 6-foot filter gave a considerably better effluent than the 4-foot filter and that the 8-foot filter was much better than the 6-foot. The effluent of the 10-foot filter (probably due to sampling errors) was of slightly poorer quality than that of the 8-foot filter. The results, however, show strikingly the greater efficiency of the deeper filters.

Average Analyses (Six Months)

Effluents from Trickling Filters.—Effect of Different Depths

(Parts per Million)

Filter Number	Depth (Feet)	Size of Stone (Inches)	Quantity Applied — Million Gallons Daily per Acre Foot	Ammonia: Free	Ammonia: Albuminoid: Total	Ammonia: Albuminoid: In Solution	Kjeldahl Nitrogen	Nitrogen As—: Nitrates	Nitrogen As—: Nitrites	Oxygen Consumed	B.O.D.	Relative Stability*
Settled sewage	–	–	–	37.1	7.74	3.99	14.	–	–	41	312	–
452	4	¾–1½	.41	13.8	2.74	1.92	5.0	6.1	.09	14	50	71
453	6	¾–1½	.41	16.8	2.33	1.73	4.2	6.3	.13	14	40	80
454	8	¾–1½	.41	13.3	1.91	1.45	3.5	16.1	.17	11	20	98
455	10	¾–1½	.41	17.7	2.70	1.94	5.0	13.6	.33	16	26	98

*Methylene Blue Test.

Filter No. 475 is 10 feet in depth and filled with crushed stone passing a 2½-inch screen and retained on a 1½-inch screen. It was formerly operated the same as Filters Nos. 452–455, inclusive. On July 1, the rate was changed to 1,500,000 gallons per acre daily.

The trickling filter longest in use at the Experiment Station, No. 135, has been in operation thirty-eight years and is constructed of 10 feet in depth of walnut-size crushed stone. Stone of this size has been found to be rather small for practical use and while this filter has given a very good effluent, there has been a tendency toward clogging of the upper portion.

Filter No. 677, 10 feet in depth, filled with crushed stone passing a 1½-inch screen and retained on a ¾-inch screen, was started on September 1, 1937.

Filters Nos. 135, 475 and 677 are of the same depth and operated at the same rate, differing only in the size of crushed stone. A comparison of the analyses of these three filters shows the effect of the different sizes of filtering material. There is not much difference in the analyses, although the effluents of the two filters with the finest stone are somewhat better than that of the one with the coarsest stone. It seems probable that the differences will be greater over a longer period of operation. The efficiency of Filter No. 135 was not as good as usual because the upper portion of the stone clogged. This condition was partially relieved by raking and flushing. The walnut-size stone in this filter has proved to be too small for the best results.

Average Analyses

Effluents from Trickling Filters.—Effect of Different Size Crushed Stone

(Parts per Million)

Filter Number	Depth (Feet)	Size of Stone (Inches)	Quantity Applied — Million Gallons Daily per Acre Foot	Ammonia: Free	Ammonia: Albuminoid: Total	Ammonia: Albuminoid: In Solution	Kjeldahl Nitrogen	Nitrogen As—: Nitrates	Nitrogen As—: Nitrites	Oxygen Consumed	B.O.D.	Relative Stability***
Settled sewage	–	–	–	37.1	7.74	3.99	14.	–	–	41	312	–
**135	10	Walnut	.15	11.8	2.17	1.66	3.7	16.0	.11	14	28	87
*677	10	¾–1½	.15	8.87	2.06	1.47	3.7	15.9	.46	13	27	99
**475	10	1½–2½	.15	12.1	2.37	1.74	4.3	9.9	.35	15	28	88

*In operation 4 months. **Average for 6 months. ***Methylene Blue Test.

Three filters, Nos. 677, 572 and 573 have been operated to study different forms of pre-treatment of sewage applied to trickling filters. The sewage applied to Filter No. 572 received four grains per gallon ferric sulphate. The daily dose of sewage applied to Filter No. 573 was stored in a conical bottom tank and dis-

charged to the filter continuously. A jet of air was blown through the sewage in the tank continuously, giving an average dissolved oxygen content of 6.0 parts per million. The sludge was drained from this tank daily so that there was very little, if any, activated sludge effect. Filter No. 677 was operated as a control, with no pre-treatment of the applied sewage. There was little difference in the analysis of the effluents of the three filters, that from the filter receiving the ferric sulphate being lower in B.O.D., soluble albuminoid ammonia, and suspended solids. It was also much clearer, due to the coagulating effect of the ferric sulphate. The ferric hydroxide formed had a tendency to clog the filter in spite of heavy unloading at times. It was necessary to shovel over the upper foot of stone and give the filter a thorough flushing in September.

Average Analyses

Effluents from Trickling Filters.—Effect of Different Preliminary Treatments

(Parts per Million)

Depth (Feet)	Size of Stone (Inches)	Quantity Applied — Million Gallons per Acre Daily	Ammonia			Kjeldahl Nitrogen		Nitrogen As—		Oxygen Consumed	B.O.D.		Relative Stability**
			Free	Albuminoid Total	Albuminoid In Solution	Total	In Solution	Nitrates	Nitrites		Unsettled	Settled	
					Settled Sewage								
–	–	–	36.	8.04	4.24	15.0	8.0	–	–	45.	312	–	–
					*Filter 677 (Control)**								
10	¾–1½	1.5	8.87	2.06	1.47	3.7	–	15.9	.46	13.	–	27	99
					Filter No. 572 (settled sewage applied receives 4 g.p.g. ferric sulphate)								
10	¾–1½	1.5	12.9	1.15	.944	2.4	–	16.3	.13	7.6	–	20	97
					Filter No. 573 (receives settled sewage aerated)								
10	¾–1½	1.5	12.0	2.13	1.54	3.8	–	16.7	.24	12.	–	22	98

*Operated 4 months. **Methylene Blue Test.

Trickling Filters Operated at Very High Rates

In the operation of all types of sewage filters, it has been the general practice to get as much purification and nitrification as practicable but there is a growing interest in the development of processes of partial purification to meet special cases where a high degree of purification is not needed. One of the developments along this line is the operation of trickling filters at rates of ten or more times conventional rates. Rates as high as 25,000,000 gallons per acre daily have been used and, in some instances, with the re-circulation of part of the effluent, as it is claimed that this increases the net purification.

Three trickling filters have been operated at high rates during most of the year. Filter No. 650 (6-inch akron pipe) was started in May, 1935, and is 10 feet deep and filled with crushed stone passing a 2½-inch screen and retained on a 1½-inch screen. It was operated at a rate of 20,000,000 gallons per acre daily during 1937.

Filter No. 670, started April 22, 1937, has been operated at the same rate. This filter is 2 feet square, has a depth of 10 feet and is made up of perforated tile so placed that the holes in the tile are in line for the whole depth. The holes are one inch in diameter and are separated by ¼-inch of tile.

Filter No. 571 is 10 feet deep and filled with crushed stone passing a 1½-inch screen and retained on a ¾-inch screen. This filter had operated for over six years at the conventional rate of 1,500,000 gallons per acre daily but beginning March 15, 1937, the rate was increased 1,000,000 gallons a week until on August 1 its rate of operation was 20,000,000 gallons per acre daily. The filter is made of 20-inch akron pipe with open joints and rests on a concrete base with channels for

collecting the effluent. The joints were cemented and the base made air-tight except for an opening 6 inches long and about ¾ of an inch high for discharge of the effluent. Half-inch pipes, extending to the center of the filter, were sealed into the sides at 4, 6 and 8 feet from the top of the filter and capped with petcocks. They were used for the collection of air samples from the interior of the filter.

Frequent analyses were made for carbon dioxide and oxygen. Up to October 1 about 15 per cent of oxygen was present in the filter at the three depths, and the CO_2 was about 2 to 3.5 per cent. Considerable dissolved CO_2 was carried off in the effluent. About October 1, the upper foot of stone became clogged, causing ponding on the surface. The oxygen then dropped to between .4 and 2.5 per cent. This caused no noticeable effect in the effluent. Past experience has indicated that as long as any oxygen is present, aerobic conditions are maintained. Records were kept of the temperature of the air and of the effluent. As far as could be determined, the amount of deposit on the stone, instead of the temperature, was the controlling factor of the amount of oxygen in the interior of the filter.

Clogging has been experienced in all three filters of crushed stone operated at high rates and the difficulty is attributed to the nature of the deposit on the stone. It is more like sewage slime than the deposit in filters operated at conventional rates, and because of this, it does not slough off as the deposits in the ordinary filters do. On the other hand, the perforated tile filter showed no tendency to clog.

The effluent from the tile filter had a B.O.D. reduction of 45.5 per cent compared to the average reduction of the two crushed stone filters of 60.4, and a relative stability of 11 compared to 16 for the stone filters. Most of the biochemical action is on the carbonaceous part of the sewage. In the filters operated at conventional rates, the nitrogenous portion is stabilized and nitrification takes place.

In any sewage purification process, the most important question is: Has the sewage been purified sufficiently so as not to cause objectionable conditions in the diluting body of water? This may be answered by the B.O.D. of the plant effluent but not necessarily by the per cent reduction of the B.O.D. If the raw sewage has a B.O.D. of 1,000 parts per million and the treatment plant removes 85 per cent, the effluent still has a B.O.D. of 150 parts per million. This is larger than for some raw sewages and the treatment may be entirely inadequate. On the other hand, with a raw sewage having a B.O.D. of 200 parts per million, only 60 per cent may be removed by treatment and the remaining 80 parts per million may cause nuisance. That the quality of the filter effluent must be considered with the per cent purification, must not be lost sight of.

Average Analyses

Effluents from Trickling Filters.—Effect of Different Rates

(Parts per Million)

Filter Number	Depth (Feet)	Size of Stone (Inches)	Quantity Applied: Million Gallons per Acre Daily	Ammonia: Free	Ammonia: Albuminoid: Total	Ammonia: Albuminoid: In Solution	Kjeldahl Nitrogen: Total	Kjeldahl Nitrogen: In Solution	Nitrogen As—: Nitrates	Nitrogen As—: Nitrites	Oxygen Consumed	B.O.D.: Unsettled	B.O.D.: Settled	Relative Stability***
Settled sewage	–	–	–	36.	8.04	4.24	15.	8.0	–	–	45	312	–	–
*571	10	¾–1½	20.	28.9	4.19	2.80	7.6	5.4	.385	.032	21	166	126	19
650	10	1½–2½	20.	25.3	3.93	2.79	6.9	5.0	.500	.075	25	163	121	13
670	10	Perforated Tile	20.	33.8	5.45	3.25	9.7	6.1	.347	.098	26	225	170	11
455	10	¾–1½	4.1	16.9	2.47	1.83	4.5	–	10.6	.33	15	–	27	96
**677	10	¾–1½	1.5	8.87	2.06	1.55	3.7	–	15.9	.46	13	–	27	99

*In operation 5 months. **In operation 4 months. ***Methylene Blue Test.

Average Suspended Solids

Effluents from Trickling Filters

(Parts per Million)

Filter Number	Depth (Feet)	Unsettled Samples			Settled Samples		
		Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed
		Average for Six Months					
Settled sewage	–	151	121	30	–	–	–
135	10	91	58	33	30	23	7
452	4	62	46	16	19	16	3
453	6	95	65	30	25	21	4
454	8	71	55	16	16	13	3
455	10	146	103	43	38	32	6
475	10	91	67	24	27	22	5
*677	10	234	109	125	27	20	7
		Average for Twelve Months					
Settled sewage	–	153	123	30	–	–	–
455	10	149	101	48	35	29	6
650	10	94	71	23	49	40	9
670	10	108	86	22	58	50	8
**571	10	73	60	13	48	43	5
572	10	174	91	83	24	16	8
573	10	174	100	74	30	24	6

*In operation 4 months. **Average for 5 months.

Biochemical Oxygen Demand of River Water

The 5-day B.O.D. and dissolved oxygen of the Merrimack River water were determined once in June and twice monthly from July to November, inclusive, at the same stations as during the eight previous years, with an additional station below Nashua, N. H. As a whole, the B.O.D. determinations were slightly lower than last year but the general relation between the different stations was unchanged.

Average Analyses of Merrimack River Water

Station	B.O.D. (Parts per Million)	Dissolved Oxygen Per Cent of Saturation
Below Nashua	1.6	79.3
At Tyngsborough	2.3	73.8
Above Lowell	2.4	77.9
Below Lowell	2.3	79.4
Above Lawrence	1.7	72.8
Below Lawrence	13.5	62.8
Above Haverhill	4.6	73.3
At Groveland	5.2	46.4
Above Amesbury	3.4	62.3
Above Newburyport	3.1	58.1

Purification of Polluted Surface Water by Storage

The study of the effect of storage on the purification of water, begun in 1930, has been continued. Two covered concrete tanks, 16 feet in diameter with an effective depth of 3 feet 9 inches, are used. A small door in each tank allows diffused light to enter during the warmer months but during the winter the doors are closed. The first tank is divided by concrete walls into three sectors, one about as large as the other two. The second tank is divided into four equal sectors. These seven compartments are connected in series, the inlet in each case being at the bottom and the outlet near the top. Merrimack River water is passed continuously into the first compartment at such a rate that the total detention period is thirty days. Probably because of the absence of direct sunlight practically no color reduction resulted during this period of storage, the average color for the past seven years of the river water entering the tank being 42 parts per million,

and the color after storage, 40. Bacteria of the coli-aerogenes group were reduced 99.58 per cent, and of the 20°C. bacteria, 97.68 per cent was removed. Storage removed practically all suspended matter and reduced the free, total and soluble albuminoid ammonia.

A sand filter, No. 577, was operated at a rate of 2,500,000 gallons per acre daily with the stored water, and a duplicate filter, No. 576, was operated with river water such as entered the storage tank. Both of these filters contain 4 feet in depth of sand with an effective size of .25 millimeter. The low bacterial efficiency of the filter receiving the stored water is typical of the results obtained when a water free from suspended or easily coagulable matter is filtered through a slow sand filter.

Storage of Merrimack River Water.—Effect on Filtration

Average Chemical Analyses

(Parts per Million)

	Color	Ammonia			Chlorides	Nitrogen as —		Oxygen Consumed	Hardness
		Free	Albuminoid						
			Total	In Solution		Nitrates	Nitrites		
Filter No. 576:									
Raw river water applied	40	.111	.242	.175	3.3	.176	.006	5.8	14
Effluent from	25	.021	.111	–	3.4	.299	.000	4.1	14
Filter No. 577:									
Stored river water applied	37	.017	.162	.143	3.4	.286	.001	5.3	24
Effluent from	32	.012	.129	–	3.2	.339	.003	4.7	25

Purification of Merrimack River Water by Storage

Average Bacterial Analyses

	Bacteria per Cubic Centimeter			Coli-Aerogenes Group in 100 c.c.
	4 Days 20°C.	24 Hrs.—37°C.		
		Total	Red	
River water before storage	10,000	2,200	150	4,800
River water after 30 days' storage	291	31	1	34
Effluent from Filter No. 576*	268	19	3	53
Effluent from Filter No. 577**	323	33	3	29

* Raw water applied. ** Stored water applied.

Lawrence City Filters

As has been the custom for the past forty-four years, the Lawrence Experiment Station staff maintained during 1937 a general oversight of the operation and the bacterial efficiency of the Lawrence city filters. The chlorine plant was inspected weekly and bacterial examinations of samples of the water before and after filtration were made nearly every day.

The water supply of the city of Lawrence has been taken from the Merrimack River since 1875 but since 1893 the water thus taken has been filtered and since 1918 the filtered water has been treated with chlorine as an added measure of safety. Three filters are in use. The oldest filter, 2.2 acres in area, is divided into three sections, one of which is covered; the second, a covered filter, 0.75 of an acre in area, was built in 1907; the third filter, also covered, was completed early in 1926 and is 0.75 of an acre in area. The average volume of water filtered during 1937 was 4,313,000 gallons a day. Liquid chlorine was applied to the filtered water as a solution in the pump-well at the average rate of 1.74 parts per million and no attempt was made to maintain any definite residual chlorine. The average ten-minute residual at the times chemical samples were collected, was .27 of a part per million. It is seldom necessary to change the rate of chlorination as the chlorinated water pumped is subjected to a considerable period of storage before being supplied for water consumption. The chlorinated water is pumped directly to an open storage reservoir holding about 41,500,000 gallons, from which the greater part of the city is supplied by the low service system. In 1931 an electrically driven pump was installed to supply water for the high service system from the

reservoir. Daily samples for bacterial examination are collected after chlorination and the amount of chlorine to be added is governed by the results of these examinations. This amount of chlorine is very high as compared with that used in many supplies but is no higher than has been found to be necessary to treat adequately the water of the Merrimack River even after filtration through slow sand filters. The bacterial efficiency of the various filters as shown by the four-day 20°C. count has averaged better than 99.3 per cent. The coli-aerogenes index, or the number of bacteria of the coli-aerogenes group in 100 cubic centimeters, shows an average of 99.7 per cent reduction but the number present in the final effluent is still higher than now allowed under the U. S. Treasury Department standard. After chlorination, however, the average number is less than one, which is well within the standard. There has been some increase in the 20°C. bacteria count in the water of the open storage reservoir, partly because of an "after growth" following chlorination and partly because of contamination by dust. There is no means of measuring the rates of the individual filters and no way of collecting samples from the west covered filter. The rate of pumpage is measured by a Venturi meter on the forcemain.

For many years it has been the custom in collecting chemical samples once a month to take only one sample from the combined effluents of the three units of the old East filter. Since the rehabilitation of the filters, after the 1936 flood, samples have been collected from each unit separately, from the North filter, and the river, three times monthly, in addition to samples collected once a month as formerly. The excavations about the pumping station in connection with the construction of the new filter plant affected the flow of ground water and resulted at times in larger amounts reaching the underdrains of the East covered, and the East and West open filters. This was shown by higher iron and hardness in the effluent from these filters.

As a direct result of the experiences during the 1936 flood, a rapid sand filter, to be used as a preliminary filter in combination with the slow sand filters, is under construction. This will be located at a higher level so as to be entirely safe in future floods.

Average Bacterial Analyses of Water collected in connection with the Lawrence City Filters

Source of Sample	Bacteria per Cubic Centimeter			Per Cent of Bacteria Removed			Coli-Aerogenes Group in 100 c.c.
	4 Days 20°C.	24 Hrs.—37°C. Total	24 Hrs.—37°C. Red	4 Days 20°C.	24 Hrs.—37°C. Total	24 Hrs.—37°C. Red	
Merrimack River	11,000	1,400	330	–	–	–	13,000
Old East Filter—East Covered Section	80	6	1	99.3	99.6	99.7	30
Old East Filter—East Open Section	120	13	1	98.9	99.1	99.7	36
Old East Filter—West Open Section	50	7	1	99.6	99.5	99.7	22
North Covered Filter	40	5	1	99.7	99.7	99.7	48
All Filters after Chlorine Treatment	14	2	0	99.9	99.8	100.	–*
Outlet from Distributing Reservoir	140	18	0	98.7	98.7	100.	–*
Tap at City Hall	160	7	0	98.5	99.5	100.	–*
Tap at Experiment Station	120	8	0	98.9	99.4	100.	–*
High Service System	110	9	0	99.0	99.4	100.	–*

*Less than 1.

Average Chemical Analyses of Water collected in connection with the Lawrence City Filters

(Parts per Million)

Source of Sample	Color	Ammonia		Chlorides	Nitrogen as Nitrates	Oxygen Consumed	Iron	Manganese	Hardness
		Free	Albuminoid						
Merrimack River	39	.145	.251	3.1	.168	6.3	.49	.04	12
Old East Filter (three sections)	43	.341	.117	4.2	.347	4.2	1.31	.24	18
East Covered Section	35	.190	.113	3.5	.251	4.6	1.04	.14	16
East Open Section	36	.250	.110	3.9	.344	4.2	.79	.13	18
West Open Section	29	.094	.105	3.2	.286	4.3	.46	.07	13
North Covered Filter	28	.034	.114	3.4	.301	4.6	.21	.04	14
Outlet of Distributing Reservoir	33	.054	.136	5.4	.296	4.0	.48	.08	14
Tap at City Hall	32	.047	.130	5.5	.304	3.9	.56	.04	12
Tap at Experiment Station	38	.043	.128	5.4	.287	3.8	.77	.05	15

Average Solids in Samples of Water collected in connection with the Lawrence City Filters

(Parts per Million)

Source of Sample	Unfiltered			In Suspension		
	Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed
Merrimack River	64	22	42	12.5	2.9	9.6
Old East Filter (three sections)	59	20	39	–	–	–
East Covered Section	55	20	35	–	–	–
East Open Section	58	21	37	–	–	–
West Open Section	49	19	30	–	–	–
North Covered Filter	50	19	31	–	–	–
Outlet of Distributing Reservoir	54	21	33	–	–	–
Tap at City Hall	54	20	34	–	–	–
Tap at Experiment Station	54	19	35	–	–	–

Rapid Sand Filter Operation

To assist the Department in advising relative to the new rapid sand filters under construction by the city of Lawrence for treatment of Merrimack River water, Federal funds were made available from the office of the U. S. Surgeon General for the establishing of a pilot plant which is 2 per cent of the capacity of one of the units planned for the Lawrence filters. This plant has been operated at the Experiment Station since March 1, 1937.

The mixing tank of the pilot plant is circular, 5 feet in diameter, and 5.5 feet high, giving a period of detention of fifty minutes. Stirring is provided by a four-blade paddle, revolving three times a minute,—a speed which has been found to give good results.

The settling tank is 16 feet long, 7.5 feet deep, and 5 feet wide, and is provided with over and under baffles, giving a detention period of 5.6 hours.

The filter, No. 666, is 2.5 feet square. The underdrains consist of 15 inches of graded gravel above a brass plate perforated with about fifty ¼-inch holes, set 9 inches from the bottom. The filtering material consists of 3 feet of sand with an effective size of .54 millimeter and a uniformity coefficient of 1.7. The rate of operation is 125,000,000 gallons per acre daily. The raw water applied to this experimental filter flows by gravity from the North Canal, and is practically of the same quality as the water applied to the present Lawrence filters.

The effluent is collected in a tank 4 by 6 by 2.5 feet, and is pumped to two elevated storage tanks with a total capacity of 1,000 gallons for use in washing the filter and supplying secondary filters.

The plan for the Lawrence supply includes the use of some of the present slow sand filters for secondary filtration. To study this secondary filtration, three filters, containing 3.5 feet of washed sand from the present Lawrence filters, having

an effective size of .33 millimeter and a uniformity coefficient of 4.0, have been operated. Every new sand filter requires a considerable period of time for ripening, and a new filter receiving a well clarified water, such as the effluent of a rapid sand filter, would be expected to require a longer time than one treating a raw water. To study this, the three slow sand filters were ripened with river water, rapid sand filter effluent, and a mixture of the two, respectively.

Filter No. 667 has received only the effluent from the rapid sand filter, No. 666. Filter No. 668 received Merrimack River water for three months, and Filter No. 669 received the effluent of No. 666 with the addition of 5 per cent of river water for about two months. After the ripening period, these two filters received only the rapid sand filter effluent. The rate of operation has been 5,000,000 gallons per acre daily. In the operation of these filters, there was no advantage in ripening the filters with a raw water.

Bacteria were found to increase in the wooden storage tanks, so that the water as applied to the secondary filters was higher in total bacteria and coli-aerogenes than the effluent of the rapid sand filter.

Filter alum, ferric sulphate, ferric chloride, and sodium aluminate were all tried as coagulants.

Ferric sulphate was used for one month. It gave, under the most favorable conditions, satisfactory coagulation and good color removal but the residual iron was always higher than in the raw water and it was difficult to maintain control of coagulation. The average amount required was 1.25 grains per gallon and the best operating pH range varied between 4.1 and 5.0.

Ferric chloride in syrup form was also used for a month. This acted very much like ferric sulphate and, in addition, required a heavier dosage to produce coagulation.

Only a few laboratory experiments were made with sodium aluminate. It was not found practicable to use this alone to coagulate the Merrimack River water but it was found useful in aiding coagulation and increasing pH.

For the rest of the year, alum was used. The average amount was 1.4 grains per gallon. Amounts as low as one grain per gallon were found sufficient in cold weather, whereas higher amounts, averaging 1.5 grains per gallon, were necessary in the warmer months. The greatest consumption was during a flood condition in the river, reaching 2.0 grains per gallon for several days. In general, coagulation with alum was a little better during the summer months than in colder weather. It was poorest at the height of flood conditions, and appreciably higher amounts of alum had to be added immediately after the flood. Generally, from 0.1 to 0.25 grains per gallon were used in excess of the minimum required in order to have a margin of safety. When the natural alkalinity of the water is 6 parts per million or over, it is generally sufficient to combine with the amount of alum required for good coagulation. Whenever the alkalinity of the water dropped below 6 parts per million, it was necessary to add soda ash.

No one definite operating pH value could be established. The value at which the best coagulation with a minimum amount of alum was obtained averaged 5.5 for the year, but ranged from 5.1 to 5.8. Variations sometimes occurred from one day to another, while at other times the value remained constant several weeks.

In general, it was found that the lower the alkalinity, the less the amount of alum necessary to secure satisfactory coagulation and it was possible to find a definite minimum pH value where good coagulation could be obtained. At times, it was possible to obtain satisfactory results for several tenths of a pH unit above the minimum value, and at other times the range was very limited.

The variations in optimum pH were not confined to any particular season of the year or to the condition of the water and could not be correlated with any of the usual chemical or physical tests made; hence, the variation was probably due to the nature of the dissolved solids.

Normally, the turbidity of the river water is 15 or less, averaging about 8; during flood conditions, it may increase to 40 or more, returning to normal in several days. Increase in turbidity alone did not affect the amount of coagulant required; in fact, a faster settling floc was obtained with high turbidity. The filter was not operated during the periods of highest turbidity because the outlet of the filter is below high water-mark.

The average color of the river water was about 35 parts per million in periods of normal flow. Higher color was generally found during the periods of low alkalinity when, as already described, it was necessary to add soda ash and increased amounts of coagulant. With alkalinities below 6 parts per million, an increase of 10 parts per million of color above 45 parts per million required an additional amount of alum, sometimes as much as one grain per gallon, and from one-half to one grain of soda ash. There is no combination of alum and soda ash which will give good results throughout the year unless two grains or more of alum are used all the time. This would be unnecessarily wasteful.

The results in general indicate that alum is the best coagulant for this water. The average alum requirement of the water is slightly above one grain per gallon. High color, or high alkalinity, causes an increase in consumption of coagulant. Soda ash is necessary only in cases of high color and low alkalinity, which is a condition of flood waters.

The average amount of wash water was slightly over 2 per cent with any of the coagulants used. The rate of rise of the wash water was 2 feet per minute. It was found that most thorough washing was obtained when the filter was allowed to drain entirely before washing. Compressed air was used during washing on several occasions. Although much greater agitation of the sand was observed, the runs following were not longer than those after washing without air, and there was a considerable loss of sand.

From July to October, inclusive, the raw water was pre-chlorinated, using amounts from 1.75 to 2.5 parts per million. This reduced the number of bacteria, especially coli-aerogenes, in the mixing and settling tanks but the value of pre-chlorination was uncertain because equally good results were obtained during the other months of the year with no chlorination.

When chlorine was applied at a rate of 1 part per million or more, there was a slight residual as it reached the filter, and the effluent had a slight chemical smell in the "Hot Odor" test.

The average bacterial analyses, as shown in the tables, indicate that under the operating conditions described, it is possible to produce an effluent generally within the U. S. Treasury Standard for coli-aerogenes. The somewhat high four-day count is probably due to secondary growth in the wooden filter tank.

The effluent was clear and sparkling, with a color of about 5, and a turbidity of zero. There was no increase in the alum content of the water. The residual iron was much less than that in the river water applied; the percentage removal was about 80, while in the combined effluents of the present Lawrence slow sand filters, there is always an increase in iron over that of the river because of the infiltration of ground water.

The hardness of the effluent from the filter, before correction, was only 2.8 parts per million higher than that of the river. The increase in free carbon dioxide was from 4.6 in the river to 11 parts per million in the effluent. The plans for the new Lawrence filters provide for aeration, which would reduce this free carbon dioxide.

Several series of samples were taken at short intervals during the first hour of operation of the filter after washing. The average coli-aerogenes index of eleven such series was 1.6, which was only slightly higher than that of the normal effluent. The color and turbidity of these samples was of the same quality as the normal effluent.

The tables give the average analyses of the water applied to, and of the effluents of the secondary filters. The bacterial content of the effluents of the secondary filters was no better than that of the rapid sand filter; in fact, during most of the time from July to November, the results were poorer. There was an increase in coli-aerogenes between the outlet of the rapid sand filter and the surface of the secondary filters. A slimy coating, which was found on the sides of the wooden storage tanks, contained coli-aerogenes at times. The storage tanks were chlorinated several times but gave only a temporary improvement.

During the rest of the year, the effluents of the secondary filters were of about the same bacterial quality as those of the rapid sand filters. Filtering the rapid sand filter effluent through these secondary filters had little effect on the chemical analysis of the water.

To insure satisfactory operation of the rapid sand filter, it was necessary to carry

on continual laboratory experiments. These were conducted in jars using a laboratory paddle stirring device which gave a peripheral speed of one foot per second.

As a basis for these jar tests, a standard "good coagulation" was adopted:—Initial floc within eight minutes, maximum size of floc within fifteen minutes; color of coagulated water filtered through paper, 8 or less; residual alum, 0.3 of a part per million or less. In all the following paragraphs, the term "good coagulation" will bear this definition.

While daily tests are necessary to determine the proper amount of coagulants, the following charts will be helpful in limiting the number of tests.

Chart No. 1 shows how the pH of the river water changes with the addition of filter alum. The two curves representing an alkalinity of 3, show how the final pH is affected by the initial pH of the water. The greatest change, due to a variation in pH, occurs in the lower regions of the graph. Alkalinities of 3 and 14 represent, respectively, the minimum and maximum alkalinities shown by the water throughout the year.

The effect of the natural alkalinity of the raw water on the amount of alum necessary to obtain a desired pH is shown in Chart No. 2. A point on any of these curves is the mean of several points, each of which is dependent on the initial pH of the raw water. Since the minimum pH for good coagulation with alum alone varied from a pH of 5.1 to 5.8, this plot may serve as a guide in determining the approximate amount of alum desired for a definite alkalinity of the raw water. For example, if the water has an alkalinity of 10 parts per million, the amount of alum necessary would vary from 1.05 to 1.9 grains per gallon, depending upon the minimum pH for good coagulation with alum alone. This pH value must be determined by test. Generally, if the alkalinity is below 6 parts per million, additional alkalinity in the form of soda ash must be added; then the resulting alkalinity of the water will determine the alum consumption. In other words, this chart will hold whether the alkalinity is that of the raw water or that of the sum of the alkalinity of the raw water and that of the added soda ash.

Charts Nos. 3, 5 and 7 show the relation between the soda ash and the alum required for good coagulation of flood, winter and summer waters.

Charts Nos. 4, 6 and 8 show for these same conditions, the range of pH for good coagulation. An examination of these six charts shows that an increase in soda ash causes an increase in the alum consumption and a broadening of the coagulation range toward the alkaline side. As is shown by the vertical line on the left of each pH curve, the minimum pH remains constant for any given water, while the maximum pH, as shown by the line on the right, increases. It is important to note that the constant pH line may vary from 5.1 to 5.8.

Charts Nos. 3 and 4 show a condition typical of flood waters. It is not possible to secure good coagulation with alum alone because of high color and low alkalinity. The theoretical minimum amount of alum necessary to produce good coagulation is at the point where the dotted lines converge; but the high color prevents this. If more alum is used, coagulation will be secured but the pH of the resulting water will be lower than the minimum pH for good coagulation, and consequently the residual alum content will rise higher than 0.3 of a part per million as limited by the definition of good coagulation. The angle between the limiting lines is much narrower than for normal winter or summer flow. This is probably caused by the low concentration of dissolved solids during periods of flood flow.

A condition typical of normal winter flow is shown by Charts Nos. 5 and 6. Although it is possible to secure good coagulation with alum alone, the range is too small, and it would be more practical to increase the amount of alum slightly and use the indicated amount of soda ash in order to obtain a wider working range.

Charts Nos. 7 and 8, typical of summer flow, indicate that good coagulation can be obtained over a broad range with alum alone; in fact, acid can be used and a reduction in alum consumption secured, although this is not advisable.

Rapid Sand Filter No. 666.—Operating Data

	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Length of run, hours	22	30	27	27	27	36	40	46	32	35
Wash water, per cent	3.2	2.1	2.5	1.8	2.5	1.8	1.7	1.5	2.1	1.9
(Grains per Gallon)										
Alum	1.25	–	1.25	–	1.40	1.50	1.50	1.30	1.70	1.30
Soda ash	0.25	0.25	0.26	–	–	–	–	–	0.38	0.20
Ferric chloride	–	–	–	2.0	–	–	–	–	–	–
Ferric sulphate	–	1.25	–	–	–	–	–	–	–	–
pH, raw water	6.4	6.3	6.2	6.4	6.4	6.6	6.6	6.6	6.4	6.5
pH, effluent	5.6	4.7	5.3	4.6	5.4	5.5	5.5	5.5	5.3	5.5
(Parts per Million)										
Alkalinity, raw water	6.	4.	5.	9.	10.	11.	11.	11.	6.	5.
Alkalinity, effluent	2.	—2.	0.	—1.	1.	2.	2.	2.	1.	0.
Soap hardness, raw water	13.	8.	8.	11.	13.	14.	18.	19.	18.	16.
Soap hardness, effluent	14.	13.	10.	16.	15.	18.	21.	25.	22.	19.
Color, raw water	30.	34.	41.	51.	40.	38.	35.	38.	50.	45.
Color, effluent	4.	5.	4.	5.	4.	4.	5.	4.	5.	5.
Iron, raw water	0.17	0.24	0.35	0.45	0.52	0.62	0.41	0.45	0.47	0.23
Iron, effluent	0.07	0.38	0.03	0.08	0.07	0.05	0.05	0.07	0.09	0.13
Free CO_2, raw water	5.	4.	4.	5.	5.	5.	5.	5.	4.	3.
Free CO_2, effluent	9.	12.	8.	13.	11.	11.	13.	12.	12.	9.
Residual alum, raw water	–	–	0.34	–	0.30	0.26	0.20	0.31	0.5	0.4
Residual alum, effluent	–	–	0.23	–	0.15	0.15	0.17	0.41	0.5	0.4

Average Bacterial Analyses

	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Bacteria per Cubic Centimeter 4 days, 20° C.										
Raw water	5,000	5,900	6,300	8,500	12,000	26,000	19,000	14,500	12,000	2,200
Coagulated and settled water before filtration	–	1,100	1,100	1,800	1,200	300	300	650	550	425
Effluent of Rapid Sand Filter No. 666	800	540	400	7,200	680	560	760	1,200	400	160
Stored effluent of Filter No. 666 as applied to secondary filters	–	–	800	750	1,100	1,100	900	2,100	8,100	1,500
Effluent of secondary Filter No. 667	–	950	450	600	550	1,100	475	475	1,900	475
Effluent of secondary Filter No. 668	–	450	120	120	550	650	550	400	1,700	850
Effluent of secondary Filter No. 669	–	11,000	800	550	500	700	550	450	1,000	475

Coli-Aerogenes Group in 100 Cubic Centimeters

Raw water	4,400.	1,900.	5,100.	8,000.	7,100	7,000.	5,700.	5,800.	5,700.	7,100.
Coagulated and settled water before filtration	–	340.	21.	235.	3	0.2	0.	2.0	10.	4.4
Effluent Rapid Sand Filter No. 666	3.	13.	1.	3.	2	0.6	0.	0.5	0.4	0.4
Stored effluent of Filter No. 666 as applied to secondary filters	–	–	0.2	2.	4	3.	2.	0.8	3.2	2.1
Effluent of secondary Filter No. 667	–	4.	0.7	3.	12	0.2	2.7	1.5	1.7	0.
Effluent of secondary Filter No. 668	–	60.	21.0	11.	9	0.7	2.3	4.	2.0	0.05
Effluent of secondary Filter No. 669	–	1.8	3.0	2.6	7	0.4	2.3	2.	1.5	0.1

Rapid Sand Filters.—Average Chemical Analyses

(Parts per Million)

Color	Ammonia			Chlorides	Nitrogen As—		Oxygen Consumed	Iron	Alkalinity	Hardness	pH
	Free	Albuminoid									
		Total	In Solution		Nitrates	Nitrites					
Raw River Water (applied to Filter No. 666)											
40	.111	.242	.175	3.3	.176	.006	5.8	.39	8	14	6.4
Effluent of Filter No. 666 (applied to Secondary Filters)											
5	.109	.086	–	4.3	.163	.002	1.8	.10	1	17	5.3
Effluent of Secondary Filter No. 667											
6	.032	.079	–	4.5	.214	.002	1.6	.08	7	14	–
Effluent of Secondary Filter No. 668											
6	.030	.096	–	4.3	.272	.001	1.6	.08	11	17	–
Effluent of Secondary Filter No. 669											
7	.037	.077	–	4.7	.210	.001	1.7	.07	7	14	–

Operation of Roughing Filters with Merrimack River Water

A concrete filter, 5 feet in diameter and 4 feet deep, was constructed out of doors. It was divided by walls into three equal sectors, each making a separate filter. There were 28 inches of filtering material over 18 inches of graded underdraining material in each filter. River water was applied through self-rotating sprinkler arms. It was intended to operate these filters as trickling filters at around 45,000,000 gallons per acre daily.

The sand in these filters was screened so that 86 per cent was between 1 and 2 millimeters in diameter and 14 per cent was finer. This proved to be too fine for operation at a 45,000,000-gallon rate. Another lot of sand was screened to obtain a size such that 84 per cent was between 2 and 3.5 millimeters. This was also too fine. Finally, Filter 676 was filled with a sand 80 per cent of which was between 3.5 and 4 millimeters, the remainder being finer. Filter No. 674 contained sand, or stone screened from sand, between 6 and 12 millimeters. Filter No. 675 contained stone between 12 and 22 millimeters. With these sizes of materials, it was possible to maintain rates of 45,000,000 gallons per acre daily. Filter No. 676, with the finest material, became clogged and had to be back-washed about once a week. There was no need of back-washing the two filters with the coarser material. Two of the filters (Nos. 676 and 674) were operated four months and one filter (No. 675) two months.

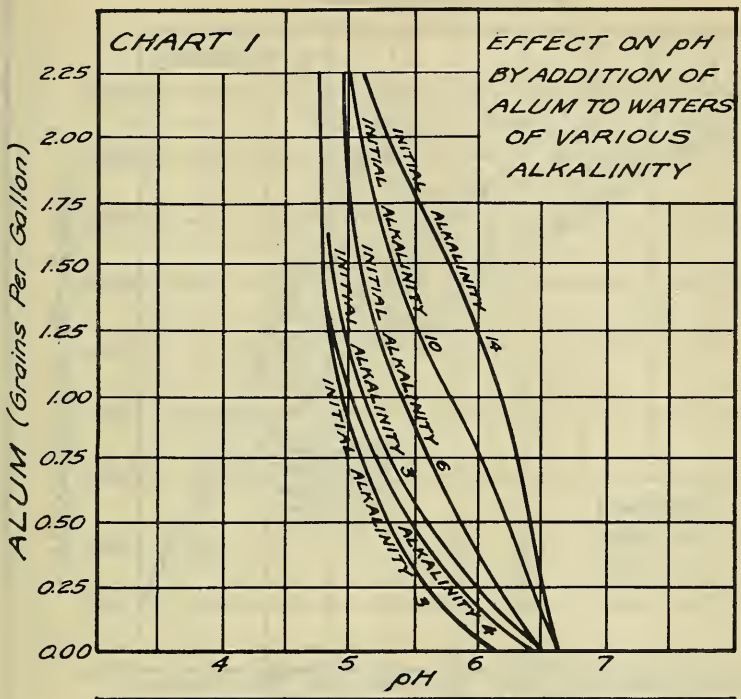
The bacterial purification, as shown by the reduction of coli-aerogenes, was best in the filter with the finest material and averaged 58 per cent reduction. This amount of purification could be obtained more readily and economically by prechlorination but pretreatment by filtration would be less susceptible to interruption. The chemical purification was slight. Filter No. 676 removed some suspended matter but this was at the expense of frequent back-washing.

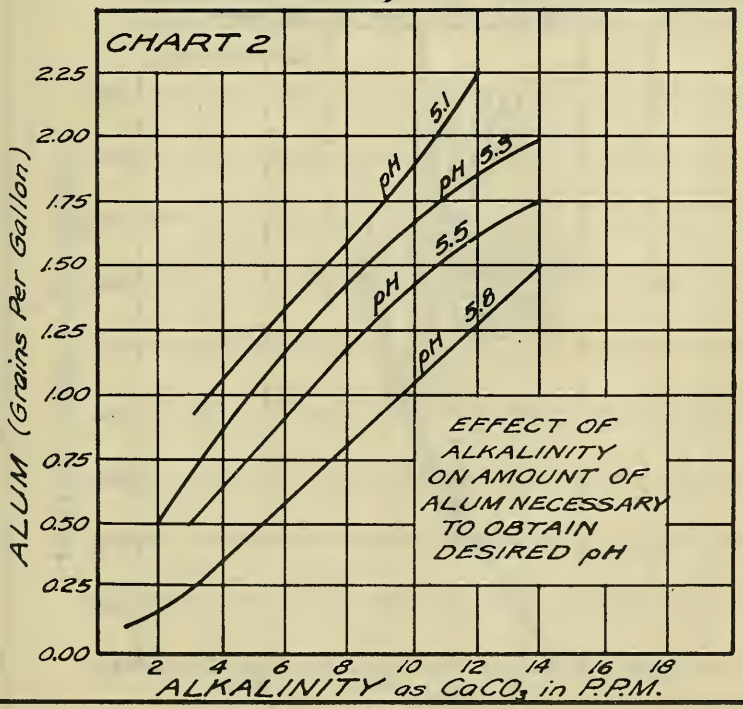
Per Cent of Coli-Aerogenes Removed by Roughing Filters

Filter Number	*Size of Material (Millimeters)	August	September	October	November	Average
676	*3.5— 4	46	77	45	51	58
674	6 —12	44	67	43	35	55
675	12 —22	—	—	13	21	17

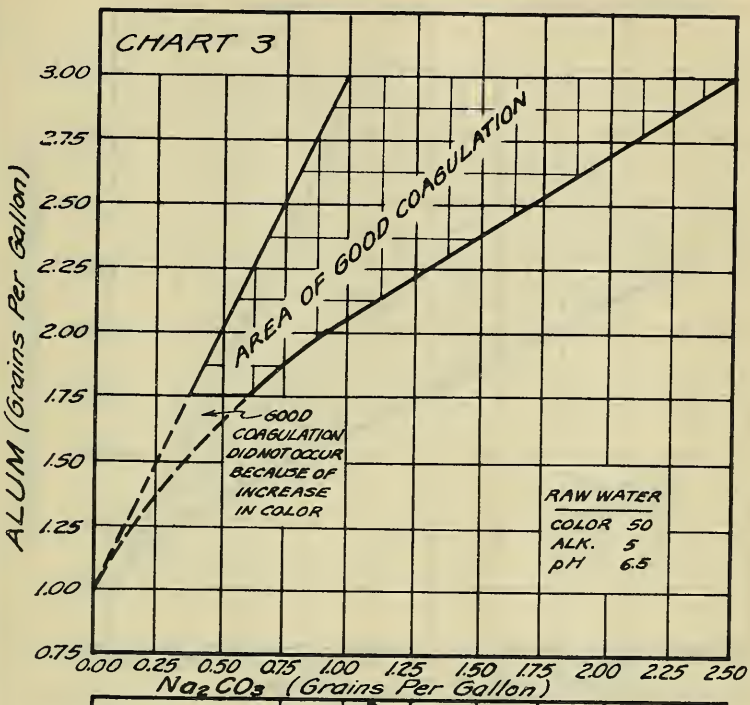
* 80% between these limits; 20% finer.

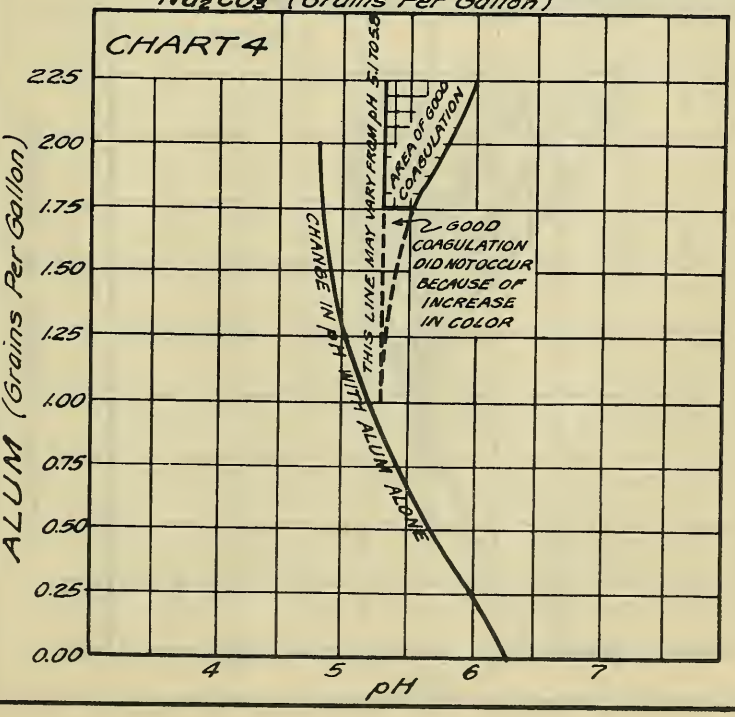
COAGULATION EXPERIMENTS WITH MERRIMACK RIVER WATER



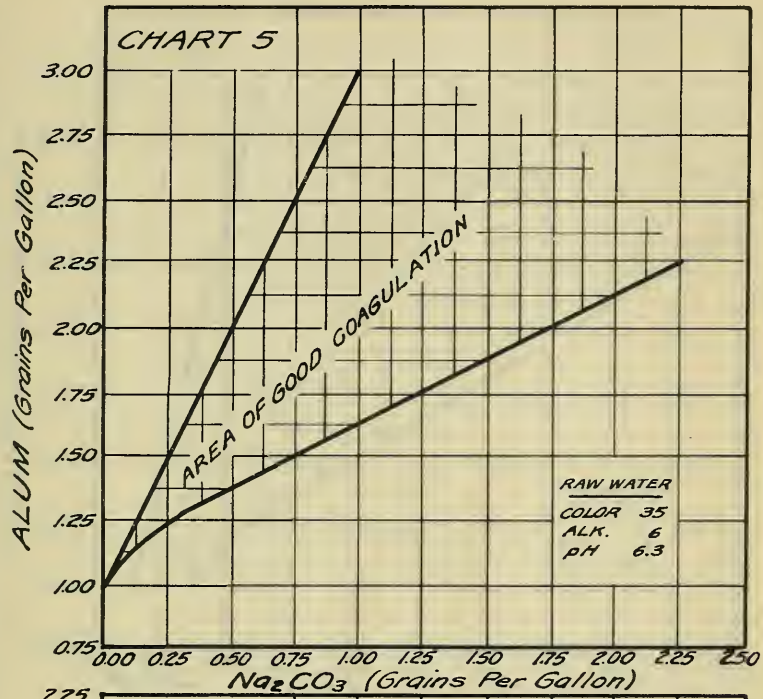


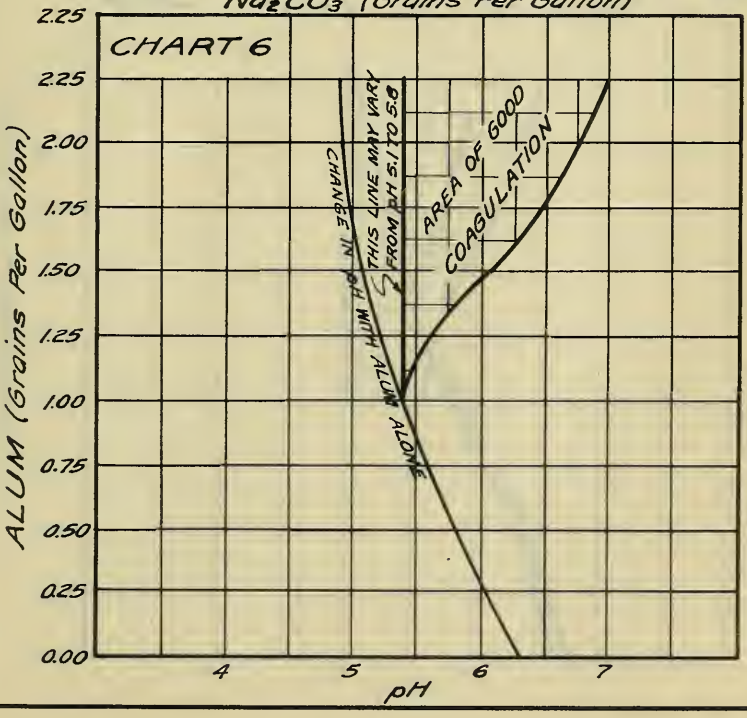
COAGULATION EXPERIMENTS WITH MERRIMACK RIVER WATER
FLOOD CONDITIONS





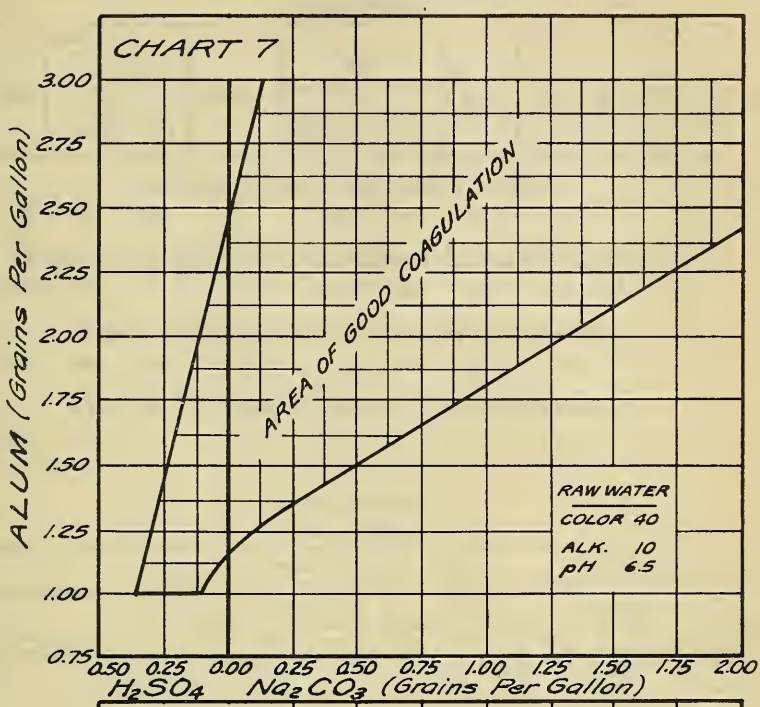
COAGULATION EXPERIMENTS WITH MERRIMACK RIVER WATER
WINTER CONDITIONS

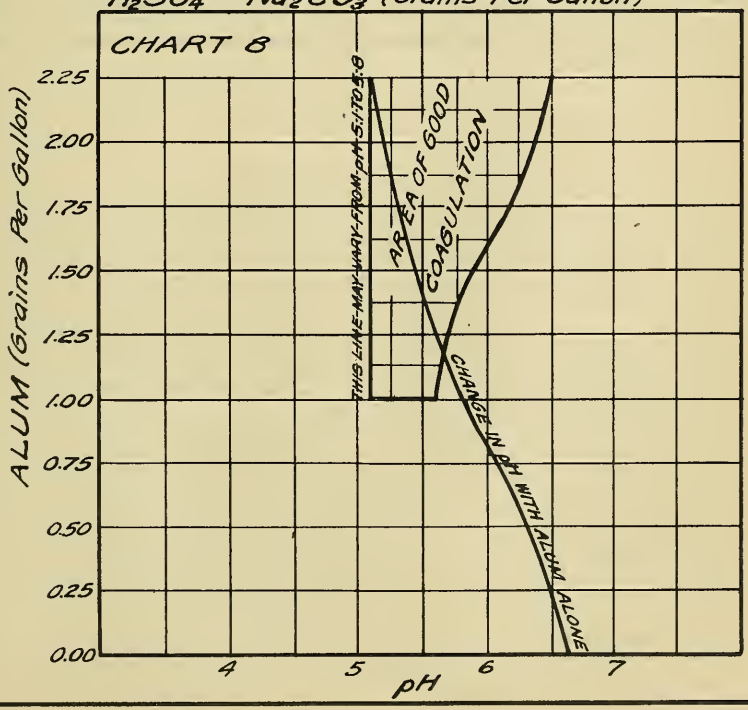




COAGULATION EXPERIMENTS WITH MERRIMACK RIVER WATER

SUMMER CONDITIONS





Average Analyses

Effluents from Roughing Filters receiving Merrimack River Water

(Parts per Million)

Color	Ammonia			Chlorides	Nitrogen As—		Oxygen Consumed	Iron	Alkalinity	Hardness	pH
	Free	Albuminoid									
		Total	In Solution		Nitrates	Nitrites					
Merrimack River Water applied to Filters											
43	.168	.305	.212	5.1	.220	.008	6.7	.63	10	17	6.6
Filter No. 676 (80% of material between 3.5 and 4.0 millimeters)											
41	.077	.247	–	4.9	.247	.001	6.0	.43	9	17	–
Filter No. 674 (material between 6 and 12 millimeters)											
40	.078	.333	.201	5.01	.277	.002	6.1	.45	9	17	–
Filter No. 675 (material between 12 and 22 millimeters)											
47	.179	.271	–	4.8	.151	.009	6.5	.44	9	16	–

Average Solids

(Parts per Million)

Filter Number	Unfiltered			In Suspension		
	Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed
Merrimack River Waste .	68	33	35	9.2	3.1	6.1
676	–	–	–	2.0	1.0	1.0
674	–	–	–	5.2	2.5	2.7
675	–	–	–	–	–	–

REPORT OF THE DIVISION OF TUBERCULOSIS

Alton S. Pope, M.D., *Director*
Louis N. Phaneuf, *Assistant Director*
David Zacks, M.D., *Chief of Clinics*

I have the honor to submit the eighteenth annual report of the Division of Tuberculosis. This report includes an outline of the principal activities of the Division, the annual reports of the four State Sanatoria and the Pondville Cancer Hospital for the fiscal year ending November 30, 1937, together with certain developments in tuberculosis control in the State at large.

For the first time a ratio of over two new cases of pulmonary tuberculosis for each annual death in the State was reached in 1937. At the same time there was a slight increase in the number of deaths from pulmonary tuberculosis. A sharp decline in the deaths from extrapulmonary forms of the disease brings the total death rate from tuberculosis slightly lower than ever before but in view of a stationary death rate for the country as a whole in 1936 it would appear that we have reached a point where further reductions in the tuberculosis mortality can be expected only at the price of increased effort. It is, however, encouraging that improved methods of case finding are bringing to light a larger number of cases in proportion to deaths.

Tuberculosis Deaths and Death Rates per 100,000

Massachusetts 1928–1937

Year	Pulmonary		Other Forms		Total	
	Deaths	Rate	Deaths	Rate	Deaths	Rate
1928	2,690	63.9	433	10.3	3,123	74.2
1929	2,561	60.5	361	8.5	2,922	69.1
1930	2,423	56.9	311	7.3	2,734	64.3
1931	2,306	53.9	248	5.8	2,554	59.7
1932	2,041	47.5	261	6.1	2,302	53.5
1933	2,058	47.7	222	5.1	2,280	52.8
1934	1,902	43.8	214	4.9	2,116	48.7
1935	1,814	41.6	147	3.4	1,961	45.0
1936	1,733	39.5	165	3.8	1,898	43.3
1937	1,759	39.9	125	2.8	1,884	42.7

State Sanatoria

In 1937 the four state sanatoria furnished 387,482 days treatment to 1903 patients. Of these 1,071 were in the institutions at the beginning of the year and 832 represent new admissions. The cases were divided as follows: Rutland, 633 cases of adult pulmonary tuberculosis; North Reading and Westfield, 725 children with adult or childhood type of the disease; Lakeville, 545 cases of extrapulmonary tuberculosis and convalescent poliomyelitis. This represents a slight decrease in the number of patients treated and in the total number of patient days of treatment, due almost entirely to the diminishing need for hospitalization of children with childhood type of tuberculosis in the western part of the state.

Rising commodity prices, especially food prices, have resulted in increased per capita costs at all the sanatoria during 1937. At Rutland the gross per capita cost per week was $19.02, at North Reading $20.79, at Westfield $31.96, and at Lakeville $23.38. This represents an average increase of 10.1 per cent over 1936, but at Westfield a large part of the per capita increase was due to the rapid decline of the patient population during the year. For the other three sanatoria the average increase in per capita costs was only 4.1 per cent.

The importance of the state sanatoria as diagnostic centers is emphasized by a steady growth in the use of these institutions by physicians in all parts of the state. During the past year 7,832 diagnostic examinations were made for physicians or boards of health in the out-patient departments and consultation clinics of the four state sanatoria, 1,168 more examinations than in 1936, an increase of 17.5 per

On November 29 the first patients were admitted to the new Cancer-Tuberculosis Unit of the Westfield State Sanatorium. This thoroughly modern hospital building, the first of its type in the country, provides 50 beds for the treatment of cancer and 144 for tuberculosis. The surgical and radiological units serve both groups of patients, and the type of construction is such that when the need for hospitalization of cancer increases and the incidence of tuberculosis further declines rooms can be re-allocated from tuberculosis to cancer as required. Modern facilities are provided for the surgical and radiological treatment of all types of cancer, and all types of surgical treatment for tuberculosis patients will be given in the hospital. Out-Patient service for both cancer and tuberculosis is maintained at the new Unit.

Medical service in the cancer unit is furnished jointly by a visiting and a resident staff, as at Pondville, and a resident pathologist directs the laboratories which serve the entire hospital. Cancer patients are admitted to Westfield from that part of the state west of Worcester. Tuberculosis patients from Hampden County, outside of Springfield, are treated at Westfield under contract of the Hampden County Tuberculosis Hospital District with the State Department of Public Health and patients from other parts of the state may be admitted with the approval of the local board of health.

In addition to the hospital building the new construction at Westfield includes a nurses' home with 146 rooms, a central storehouse to serve both the old and new units, and an addition to the power plant to furnish the necessary additional heat and power. An enlargement of the laundry is included in the power plant. The total cost of the new construction, including all furnishings and equipment, architects' fees, etc., is approximately $1,135,000.

At the other state sanatoria the following minor changes and improvements have been made during the year:

The employees' dining room at North Reading has been enlarged by remodeling the space formerly used as a storeroom. Extensive repairs on the refrigerating equipment in the administration building have greatly improved the facilities for the food and ice cream services. At Lakeville a practically complete line of equipment for physiotherapy for convalescent poliomyelitis patients has been installed, chiefly with funds from the Children's Bureau. Two additional physiotherapists have also been provided to carry out the necessary treatments for this group of patients. At Rutland oil-burning ranges have been installed in the kitchen and duplicate sound picture equipment for patients and employees has been secured with a grant under the Social Security Act.

After a useful career of thirty years the Rutland Training School for Nurses has been closed. This action was made necessary by the constantly rising requirements for the training of registered nurses and the impracticability of providing the necessary full-time teaching staff and training hospital affiliations in a small and remote training school. Closure of the training school will deprive a certain number of convalescent patients of an opportunity for vocational training, but a one-year course for the training of attendant nurses has been established.

Pondville Cancer Hospital

The work of the Pondville Hospital was continued on the same high level as last year. There were 1,437 admissions, 37 less than last year. This slight decrease was due to necessary repair work on one of the wards which tied up some twelve beds for several weeks. There was, however, a considerable increase in the work of all departments of the hospital. Total operations rose from 1,372 to 1,561, an increase of 13.7 per cent. There was also an increase of 27.9 per cent in the number of x-ray treatments. Chiefly on account of these two factors the average period of hospitalization rose to 35.4 days, an increase of 2.1 over that of 1936. Autopsy permits were obtained for 79. per cent of the patients who died at the hospital, an unusual record. The Out-Patient Department of the hospital also established a new record with a total of 5,332 visits, an increase of 6.8 per cent, over last year.

It is with regret that the Department records the resignation of Dr. Richard Dresser as chief radiologist after ten years of valued service. The position has been filled by the promotion of Dr. Charles E. Dumas, assistant radiologist. Dr. Thomas Anglem has been appointed assistant surgeon to succeed Dr. Clifford Franseen, resigned.

During the year a new parking space and road in front of the hospital building have been completed. The cement retaining wall in the rear of the new service building has also been finished and the porches on the new wing of the hospital have been glassed in. A new 200,000 volt deep x-ray therapy machine and a urological x-ray table have added materially to the efficiency of the x-ray department.

A new administration building is urgently needed to provide a recreation hall for employees and patients, room for expansion of the over-crowded record and business offices and laboratories, and to house a biological laboratory essential for cancer research. Plans for such a building were prepared two years ago and should receive the earliest possible consideration from the Legislature. The need for additional housing accommodations for employees becomes more pressing with the continued growth of the hospital and the lack of adequate quarters makes it increasingly difficult to keep competent employees. The 100-bed nurses' dormitory recommended two years ago is essential to the proper operation of the hospital.

New Projects

Under the authority of Chapter 393 of the Acts of 1937 the Department has entered into a contract with the Massachusetts General Hospital for the care and treatment of a limited number of persons suffering from chronic rheumatism. The act provides that not more than twenty-five people may be cared for at one time and no one person for a period of more than six months. Patients were first admitted under this act on September 1, 1937, and 50 had been accepted up to December first. It is not the purpose of the act to attempt to hospitalize any large proportion of Massachusetts citizens suffering from chronic rheumatism but rather to determine what can be expected from the intensive hospital treatment of the various types of arthritis by physicians familiar with the problems of the disease. Preference is given to indigent patients who on discharge are referred back to their physicians for follow-up treatment. In this way a scientific appraisal of the arthritis problem will be obtained as a guide to the practicability and direction of further relief measures.

With the cooperation of the Surgeon of the First Corps area the clinic staff of the Division examined during the spring 1,100 enrollees in ten Massachusetts Civilian Conservation Corps Camps. All campers were first given a tuberculin test using 0.01 mg. of old tuberculin and negative reactors were retested with 1.0 mg. old tuberculin. A total of 70 per cent reacted to the tests. All enrollees, regardless of the test were then x-rayed. Out of the 1,100 examined only four were found to have pulmonary tuberculosis, an incidence rate certainly no higher than that in the population of Massachusetts as a whole.

Last winter the General Court passed a bill authorizing state and county sanatoria to admit for diagnostic purposes patients with pulmonary diseases other than tuberculosis. With improved diagnostic methods more and more of such cases are coming to attention, and it is believed that their temporary admission to sanatoria will be of material assistance in clarifying the diagnosis and in arranging for the proper treatment. Such patients may be admitted for periods of not over sixty days if found to be non-tuberculous.

During the year the work of the Tuberculosis Control Unit has been extended to include all of Berkshire County outside the cities and arrangements have just been completed to include the city of North Adams, where a special tuberculosis problem seems to exist. Up to the end of the year the Unit had completed examinations of all contacts in 96 families where tuberculosis was known to exist. Twenty-eight new cases of pulmonary tuberculosis were found and hospitalization of 25 cases was secured. A gratifying feature of the work has been the numerous requests of physicians for the services of the Director of the Unit as a medical consultant. During the year Dr. Twinam made 54 consultation calls at the request of 23 physicians in the area, contacts which in several instances have led to the discovery of new cases of tuberculosis.

County Sanatoria

In May the Middlesex County Sanatorium opened a new patient wing, a complete surgical unit with ten convalescent beds together with the necessary employee

buildings. This adds approximately 160 beds to the capacity of the institution and should provide for the future needs of the county, even with the intensive case finding work which is being carried on. The new operating suite now makes it possible to perform all necessary surgical work for patients at the sanatorium. During the year the sanatorium has opened new diagnostic consultation clinics in Everett and Framingham, making a total of five such clinics, in addition to the out-patient department, now serving the different parts of the county.

Last spring the Essex Sanatorium tried an innovation in nurses' training in the form of a three-day intensive course in tuberculosis at the institution for local tuberculosis nurses. The course was given by the medical and nursing staff of the sanatorium to two groups of four nurses each, with every opportunity to see and discuss all phases of modern treatment and prevention of tuberculosis. This instruction was enthusiastically received by the nurses enrolled who are now applying the principles in their respective communities. Effective public health nursing is perhaps the most important single factor in the prevention of tuberculosis, and it is hoped that this demonstration will lead to further graduate training of nurses in other tuberculosis institutions.

School Clinics

During the school year 1936–1937 the Follow-Up Clinic examined 5,198 children, of whom 4,937 were found to be improved and 432 were unimproved. Thirteen were recommended for sanatorium care and 204 were recommended for summer camp care. In addition the clinic examined 813 students in the eight State Teachers Colleges, 450 students at the Massachusetts State College and carried out the checking of old reported cases of tuberculosis for local boards of health in four cities and towns. The analysis of much valuable information on the development of pulmonary tuberculosis in children has progressed steadily during the year and will soon be ready for publication.

During the three years since the conclusion of the Ten-Year Program annual tuberculin testing of school children in the seventh, ninth and eleventh grades, with x-ray of the positive reactors, has been carried out by the staffs of the county and state sanatoria on a state-wide basis. Although desirable in securing repeated examinations of the children who complete high school, the annual checking and rechecking of these children has proved difficult and time consuming and comparatively few cases of tuberculosis have been found below senior high school.

For these reasons the Department again opened the whole question of policy at the spring meeting of the Advisory Council of County and State Superintendents. It was agreed that efforts should be concentrated on the age group where the greatest tuberculosis exists; that is, in the high schools. To avoid the interruption of annual examinations it was recommended that the entire high school group for whom consents are received be examined every three or four years, according to the school system, and that all children with positive or suspicious x-ray findings or with known family contact with tuberculosis be re-examined annually. This system would not replace the more intensive system of examinations in towns which wished to continue it. It was urged that special efforts be made to secure examination of all family contacts of children with infiltrative tuberculous lesions.

It was recommended that the intracutaneous (Mantoux) test, using 0.01 mg. old tuberculin, be used.

State Subsidy

The opening of 142 additional beds at the Middlesex County Sanatorium has led to a further increase in the state subsidy to towns during the year. The total subsidy for 1937 amounted to $473,086 82 some $11,300 more than in 1936. The opening of adequate facilities for Hampden County patients at the new Westfield Sanatorium Unit has led to the withdrawal of subsidy from the Chicopee Tuberculosis Hospital. The Holyoke Tuberculosis Hospital has been permanently closed and subsidy for convalescent cases has been withdrawn from the Central New England Sanatorium because cities and towns were unwilling to utilize the facilities offered there.

Social Service

The establishment of a new position of social worker at the Rutland State Sanatorium has finally made it possible to arrange for social service contact with every new patient at that institution. Development of the Services for Crippled Children, however, has made it necessary to assign to three of the tuberculosis social workers responsibility for service at the clinics for Crippled Children in their districts, and to the Crippled Children's social worker responsibility for the remaining district. As a result the social service time available for tuberculosis is practically the same as before. In addition the consultation service formerly given to the Nashoba Health Unit has been resumed, owing to lack of local resources to carry on the work.

During the year the service given represented an average of 180 patients per month: 958 home visits were made in 189 different cities and towns, and 2,739 contacts were made with social agencies.

Personnel Changes

On October first Dr. Philip E. Sartwell of the School Clinic Staff was granted a year's leave of absence to attend the Harvard School of Public Health. His position has been filled by the temporary appointment of Dr. Joseph M. Houser, formerly of the Essex County Sanatorium staff.

LAKEVILLE STATE SANATORIUM

Resident Officers

Leon A. Alley, M.D., *Superintendent*
John J. Decker, M.D., *Assistant Superintendent*
Peter Ferrini, M.D., *Senior Physician*
Arthur Kanserstein, M.D., *Senior Physician*
Louis Alpert, M.D., *Assistant Physician.*
William H. Moran, M.D., *Assistant Physician.*
William W. Tribby, M.D., *Assistant Physician (Pathology).*
Emanuel Kline, D.M.D., *Dentist.*
Caroline T. White, R.N., *Superintendent of Nurses.*
Ruth E. Sweet, *Public Health Nursing Supervisor (Physiotherapy).*
Grace Daley, *Head Teacher.*
Marion N. Atwood, *Head Occupational Therapist.*
Chester Taylor, *Steward.*
Florence S. Monroe, *Treasurer.*
Susan M. Murphy, *Head Housekeeper.*
Robert A. Kennedy, *Chief Power Plant Engineer.*
T. Frank Mahony, *Head Farmer.*

Non-Resident Officers

Zabdiel B. Adams, M.D., *Senior Physician (Orthopedic Surgery).*
Arthur T. Legg, M.D., *Senior Physician (Orthopedic Surgery).*
Fletcher H. Colby, M.D., *Senior Physician (Urology).*
Bryant D. Wetherell, M.D., *Senior Physician (Urology).*
William P. Beetham, M.D., *Senior Physician (Ophthalmology).*
George A. Moore. M.D., *Senior Physician (Surgery).*
Shields Warren, M.D., *Senior Physician (Pathology).*
E. Lawrence Oliver, M.D., *Senior Physician (Dermatology).*
Edward E. Jones, M.D., *Senior Physician (Othology, Rhinology, Laryngology).*

Report of the Superintendent

To Henry D. Chadwick, M.D., *Commissioner, Department of Public Health:*

I have the honor to submit the twenty-eighth annual report of the Lakeville State Sanatorium for the year ending November 30, 1937.

Financial Statement

During the year there has been expended $341,649.33 for maintenance, a gross weekly per capita cost of $23.3775. There has been collected from miscellaneous sources (the total of all collections) $149,333.82. Deducting this amount from the gross maintenance expenses leaves a net expense of $192,315.51 and a net weekly per capita cost of $13.15939. There has been collected from private sources $3,473.11, from cities and towns $143,682, from the State Board of Retirement $118.64, and from sales $2,060.07.

There were 18 patients supported wholly or in part by private funds; 370 by cities and towns; 5 state wards; 78 wholly by State; and 68 on whom settlement has not been determined.

During the year there has been expended from Special Appropriations: Fire Protection and Sprinklers, $1,941.71; Improved Water Supply System, $604.44; Occupational Therapy Shop (Construction), $419.15; Occupational Therapy Shop (Equipment), $14.75; Sewage Beds, $18.90

Population

There were 288 patients (271 tuberculosis and 17 poliomyelitis) in the sanatorium at the beginning of the year, December 1, 1936, and 270 (238 tuberculosis and 32 poliomyelitis) at the close, November 30, 1937. The largest number present at any one time was 271 tuberculosis patients and 42 poliomyelitis. The smallest number present at any one time was 232 tuberculosis patients and 17 poliomyelitis. The daily average number of patients was 281.04 (250.56 tuberculosis and 30.48 poliomyelitis); children 161.88 (139.54 tuberculosis and 22.34 poliomyelitis); adults 119.16 (111.02 tuberculosis and 8.14 poliomyelitis). There were 257 (194 tuberculosis and 63 poliomyelitis) patients admitted during the year. For the classification of patients admitted, your attention is called to Table 6. The average age of patients admitted was 24 years. (The average age of tuberculosis patients admitted was 26 years and of poliomyelitis patients 17 years). Including deaths there were 270 (226 tuberculosis and 44 poliomyelitis) patients discharged. The average duration of residence was 439 days. (The average duration of residence of tuberculosis patients was 495 days and of poliomyelitis patients 153 days). Of those discharged 194 gained 3,203.75 pounds, an average gain of 16.51 pounds. (Of the tuberculosis patients discharged 165 gained 2,981.50 pounds, an average gain of 18.07 pounds and of the poliomyelitis patients discharged 29 gained 222.25 pounds, an average gain of 7.66 pounds). There were 102,582 (91,455 tuberculosis and 11,127 poliomyelitis) hospital days of treatment, 20 more than last year. The average number of employees and officers during the year was 210.80.

Medical Report

The policies of treatment that have been found to be sound and efficient in previous years have been continued with but slight if any changes. Sixty or 30% of the 194 tuberculous patients admitted showed x-ray evidence of pulmonary infection. Thirty or 50% of the above 60 showed physical signs of pulmonary tuberculosis either active or inactive. Two of the 63 poliomyelitis patients admitted showed x-ray evidence of pulmonary infection.

There were 13 deaths during the year, 6 less than during the preceding year. There were 8 autopsies performed.

School clinic examinations were made during the late winter and spring months in Dartmouth and Westport. Nine schools, with an enrollment of 452, were visited. Consents for Von Pirquet skin tests were obtained for 263 or 58% and that number of children was tested with the following results: 90 or 34% were positive; 89 were x-rayed. Of this number 9, or 10% were found to have some x-ray findings. Four of the reactors were classified as having childhood type tuberculosis. Nine pupils were placed on the follow-up list. This work has now been discontinued by the staff members of this institution.

Surgery continues to play its very important role both in the orthopedic cases as well as in those patients suffering from tuberculosis in the soft tissues. During the past year 63 patients suffering from the after effects of infantile paralysis were admitted; some for muscle transplants or stabilization operations to correct de-

formities and others for general treatment including baking, massage, and Hubbard tub treatments.

One hundred thirty-eight ex-patients returned for check-up during the past year which is an increase of 46 over those who returned during the previous year. This close check-up is of tremendous advantage to both patient and institution.

Out-patients: Positive, 8; suspicious, 3; negative, 58; re-examination, 8; extra-pulmonary, 2; ex-patients, 138; anterior poliomyelitis, 1; total, 218.

Employees 201.

We have been fortunate in that the only contagious disease we have had this year is one case of scarlet fever. The immunization program for patients and employees has been continued.

An article entitled "Unusual Locations of Tuberculosis Lesions in the Spine" was written by Dr. Z. B. Adams and Dr. John J. Decker and published in *The Journal of Bone and Joint Surgery* of July, 1937. Two articles were written by the superintendent on "Extra-pulmonary Tuberculosis" and "After-Care of Poliomyelitis" and were broadcast by him over Station WEEI in April, 1937.

Institutional Activities

The superintendent was the principal speaker at meetings of the

Norfolk County Health Association, Inc., at Norfolk County Sanatorium.

Massachusetts State Federation of Women's Clubs at Bristol County Health Camp.

School Handicrafts and Occupational Therapy in Boston.

The following meetings were held at the sanatorium during 1937:

South Eastern District Massachusetts Dental Society.

Boston University Medical School, Orthopedic Class.

Harvard Post-Graduate Orthopedic Class.

Clinic Consultants for Crippled Children.

Plymouth District of Massachusetts Medical Society.

Harvard School of Public Health, Senior Class.

South Eastern Association of Boards of Health.

Andover Newton Theological School, Senior Class.

Commission on Public Welfare.

The occupational therapy department has had a very busy year as shown by the fact that there were 6,783 hours of shop work and 2,129 hours of ward work performed by patients in the various activities in that department. Forty-three patients enrolled for correspondence courses under the University Extension.

Graduation exercises were held in July and certificates awarded to 27 patients who successfully completed the courses in Home Hygiene and First Aid.

A troup of Boy Scouts was organized in May, sponsored by the Lyons Club of Middleboro. Books and equipment were furnished by the Rotary Club of Taunton.

The occupational therapy department held Open House in the Occupational Therapy Shop May 16 and 17 and received over 500 visitors, who inspected the shop and witnessed demonstrations of the crafts.

On July 22, a fire, of unknown origin, starting in the shavings pit in the hay barn, destroyed that structure as well as the wagon and equipment sheds close by. The bull pens, ignited from the latter buildings, were also destroyed. With the prompt and very helpful assistance of the Middleboro Fire Department, the cow barn and farm house were saved. All live stock was saved.

Personnel Changes

It is with the deepest regret that we note the death, in November, 1937, of Dr. Louis A. O. Goddu, orthopedic consultant at this institution since July 20, 1928. Dr. Goddu always rendered faithful and efficient service willingly whenever called. His teachings were an inspiration to the members of the resident staff. Dr. Alvin O. Severance, assistant physician, resigned June 30, 1937 to accept a position at the Pondville Hospital in Wrentham. Dr. William W. Tribby was appointed July 1, 1937 to succeed Dr. Severance. Dr. William H. Moran, assistant physician, resigned November 30, 1937. Miss Ruth Sweet, public health nursing supervisor (physiotherapy) resigned November 30, 1937.

Improvements and Changes

Additional refrigerating equipment has been installed in the basement of the Administration Building.

Fire protection equipment has been increased by sprinklers in six of the smaller buildings on the grounds and new fire hose.

Lavatories have been supplied in the single rooms on the Men's and Women's Wards.

New hot water storage heaters have replaced the old worn out tanks in the above buildings.

Filters have been installed for the purification of drinking water in three main buildings.

Recommendations

As the power plant is now inadequate to meet the needs of the institution it is recommended that a new larger plant be constructed.

Employees' quarters continue to be insufficient to meet the needs of the number of employees now employed here. Accordingly it is recommended that a new male employees' building be erected and an addition to the Nurses' Home be constructed.

A new building is badly needed at the earliest date possible for the housing and treatment of the anterior poliomyelitis patients, now under treatment here. This building should include a pool for underwater exercises as well as adequate space and equipment for baking, massage, respirator and vasculator treatment. This building should also provide space for a pathological and bacteriological laboratory as the present laboratory is too small for the institution's needs. An autopsy room and morgue should be provided in a new building of the above type.

As a result of the fire that destroyed the hay barn, equipment sheds, and bull pens at the Dairy, a new barn and sheds should be rebuilt as early as possible in order to relieve the difficulties, of operating the dairy, that exist at the present time.

The construction of a new milk room furnished with modern equipment is also recommended.

Acknowledgments

Clergymen of the various denominations have continued their faithful administrations that have been most appreciated by both patients and employees.

To the many friends of the institution who have continued their interest and thoughtfulness, especially at Christmas as shown by their generous donations of gifts for the children, I express the deepest appreciation of everyone.

The many loyal and faithful employees, in the service of the institution for many years, merit public approval.

I am deeply appreciative of your continued confidence and helpful cooperation.

Respectfully,

Leon A. Alley, M.D.,
Superintendent.

Surgical Report

The following operations were performed during the year:

Tuberculous Patients

Amputations foot	3	Biopsy knee	1
Appendectomies	4	Cauterization cervix	1
Arthrodeses		Curettages	
Ankle	1	Knee	1
Knee	4	Sternum and sinus tracts	1
Hip	4	Tibia	1
Hip and Osteotomy femur	1	Ulna	1
Sacro-iliac	2	Ileostomy	1
Spine	12	Laparotomy	1
Arthrotomies hip	2	Nephrectomies	9*

*Performed at Baker Memorial Hospital, Boston.

Osteotomies femur	2
Resection ribs	1
Trephine ulna	1
Ureterolithotomy	1*
Incision and drainage hip	1
Incision and drainage wrist	1
Removal cysts from ear	1
Removal gland from neck	1
Removal mole from back	1
Removal verruca from back	1

*Performed at Baker Memorial Hospital, Boston.

Tonsillectomies and adenoidectomies	4
	65
Cystoscopies	50
Transfusion	1
Open reduction comminuted fracture radius (employee)	1

Poliomyelitis Patients

Arthrodeses	
Carpo-metacarpal	1
Hoke	5
Hoke with muscle transplant	1
Hoke with Steindler stripping	4
Revised Hoke	5
Revised Hoke with muscle transplant	1
Pan arthrodeses	7
Spine	1
Subastragaloid with muscle transplant	1
Tibio-astragaloid	2
Correction hallux valgus with muscle transplant	1
Fitchet operation	1
Soutter operation	1
Osteotomy	1
Splitting and excision ileotibial band	1
Transplants	
Biceps	3
Biceps and tensor fascia lata	1
Tibialis posticus, anterior tibial, and flexor digitorum	1
	38

Casts

Plaster casts for the year were as follows (types classified):

Boots	49
with cylinder	1
with walking iron	2
Buckets	7
Cast of neck and shoulders	1
Cylinders	
Arm	15
Arm and wrist	7
Thigh	2
Leg	49
Wrist	2
with boot	28
Jackets	11
with collar	1
with helmet	7
with double short spica	40
with long short spica	6
with short single spica	5
with shoulder spica	8
with shoulder straps	78
with shoulder straps and double short spica	5
with shoulder straps and short single spica	1
Moulds	
Arm	5
Arm and wrist	1
Foot	5
Hand	5
Neck	2
Neck and shoulders	1
Pelvis and thigh	1
Thigh	2
Trunk	5
Shells	
Anterior	16
Posterior	18
Spicas	
Long short	36
Long single	20
Short single	32
Splints	
Arm	2
Hand	1
Leg	11
Wrist	3
Reinforcements	106
	597

Laboratory Report

Blood

1. Clinical Pathology:

Red counts	116
White counts	462
Differential counts	453
Hemoglobin	419
Sedimentation tests	414
Icterus index	1
Coagulation	9
Bleeding time	9

2. Chemistry:

Sugar	19
Non-protein-nitrogen	147

3. Bacteriology and Serology:

Blood culture	15
Widal	71
Blood grouping	2
Blood for Wassermann and Hinton	287
Complement fixation for G. C.	5
Spinal fluid for Wassermann	1

Sputum

Smears	8
Concentration	129
Cultures	9
Guinea pig inoculations	1

Spinal Fluids

Cell counts	6
Chemical	5
Smears	8
Inoculations	4

Urine

Routine chemical and microscopic	2,197
Inoculations	43
Kidney function test	109
Cultures	58
Tubercle bacilli smears	68

Feces

Occult blood	32
Bacteriological:	
Tubercle bacilli smears	40
Ova, etc.	7
Cultures	87

Stomach Contents

Chemical	8
Bacteriological:	
Tubercle bacilli smears	9
Inoculations	9
Cultures	2

Pathology

Surgical specimens	61
Autopsies	9

Microscopic sections	
Paraffin	295
Pus smears	139
Pus cultures	39
Pus inoculations	52
Nose and throat smears	281
Nose and throat cultures	276
Miscellaneous examinations:	
Smears	1007
Cultures	231
Inoculations	184
Specimens sent from Sanatorium to Central Laboratory:	
Cultures of feces and urine for typhoid	136
	7,979

X-rays

Number of x-rays taken from December 1, 1936, to November 30, 1937 3,302

Photographs

Number of photographs taken from December 1, 1936 to November 30, 1937 712

Dental Report

The following outline of policies of the dental department have been continued throughout the year:

Thorough oral examination upon admission.

Oral prophylaxis within a few days after admission on all whose condition warrants dental treatment.

Remainder of necessary dental treatment at subsequent sittings in the order following:

Relief of pain.
Treatment of oral infection.
Radiographs of doubtful teeth.
Fillings.
Extractions.
Restorations.

All completed mouths are dismissed for a period of six months and at termination of that time the routine is repeated.

Re-examine all patients previous to discharge whether completed cases or not.

With the continued cooperation of the medical and nursing staffs, it has been made possible to greatly reduce the number of oral infections. By constant instruction and enforcement of the simple rules for maintenance of oral hygiene, a marked improvement has been made in the condition of the mouths of the majority of the patients, over previous years.

Only two cases of Vincent's infection occurred during the year, necessitating only eight treatments in all. Both of these cases were employees. Not a single case of Vincent's infection among the patients. A gratifying result.

We still abide by the theory of supplementing the diet, in deficiency cases, with vitamin C in the form of tomato juice, and vitamin D in the form of cod liver oil, and have sufficient proof that the efforts are well worth while.

Examinations	453	Treatments	947
Prophylactic treatments	430	Restorations:	
Fillings:		Dentures:	
Permanent teeth	684	Full	12
Temporary teeth	29	Partial	12
Extractions:		Repairs	3
Permanent teeth	238	Bridges	2
Temporary teeth	146	Repairs	2

Radiographs	172	Local anesthesia:	
Irrigations	228	Novocaine	239
Vincent's infection treatments	8	Ethyl chloride	14
Root canal treatments	25	Topical	128
Pulpectomies	1	Oral surgical operations	21
General anesthesia:		Orthodontia treatments	5
Ether	2		
Ethyl chloride	3		3,804

Visits	2,029
New patients	252

School Report

The graded school work, which includes those subjects taught from the first to the eighth grade inclusive, has been continued by our three school teachers in class work on the wards and porches during the year. Individual instruction has been given to those children unable, for one reason or another, to attend class. One hundred and ten patients divided into 14 groups had regular class sessions during the school year.

Follow-up letters continue to be most encouraging and we now feel that whether a child's residence is for a few months or several years, he is qualified, upon entering the public school, to go into the grade which he ordinarily should, because of age and schooling.

The teachers also cooperate with the occupational therapists in assisting patients taking extension courses with Vocational Education.

Table 1.—*Admissions and Discharges*

Tuberculosis Patients

	Adults		Children		Totals
	Males	Females	Males	Females	
Patients in the sanatorium Nov. 30, 1936	68	54	85	63	270
Patients admitted Dec. 1, 1936, to Nov. 30, 1937	59	57	42	36	194
Patients discharged Dec. 1, 1936, to Nov. 30, 1937	80	58	49	39	226
Patients remaining in sanatorium Nov. 30, 1937	*48	56	77	57	238
Daily average number of patients	59.79	51.23	82.99	56.55	250.56
Deaths (included in number discharged)	8	2	1	1	12
*4 children reached the age of 21 during the year and were shifted to adult columns.					

Poliomyelitis Patients

Patients in the sanatorium Nov. 30, 1936	2	1	6	4	13
Patients admitted Dec. 1, 1936, to Nov. 30, 1937	13	6	24	20	63
Patients discharged Dec. 1, 1936, to Nov. 30, 1937	7	4	20	13	44
Patients remaining in sanatorium Nov. 30, 1937	8	3	10	11	32
Daily average number of patients	5.06	3.08	13.15	9.19	30.48
Deaths (included in number discharged)	–	–	1	–	1

Total of Tuberculosis and Poliomyelitis Patients

Patients in the sanatorium Nov. 30, 1936	70	55	91	67	283
Patients admitted Dec. 1, 1936, to Nov. 30, 1937	72	63	66	56	257
Patients discharged Dec. 1, 1936, to Nov. 30, 1937	87	62	69	52	270
Patients remaining in sanatorium Nov. 30, 1937	*56	59	87	68	270
Daily average number of patients	64.85	54.31	96.14	65.74	281.04
Deaths (included in number discharged)	8	2	2	1	13
*4 children reached the age of 21 during the year and were shifted to adult columns.					

Table 2.—*Civil Condition of Patients Admitted*

Tuberculosis Patients

	Adults		Children		Totals
	Males	Females	Males	Females	
Single	26	22	42	35	125
Married	30	28	–	1	59
Widowed	3	6	–	–	9
Divorced	–	1	–	–	1
	59	57	42	36	194

Poliomyelitis Patients

Single	8	3	24	20	55
Married	4	3	–	–	7
Widowed	–	–	–	–	–
Divorced	–	–	–	–	–
Separated	1	–	–	–	1
	13	6	24	20	63

Total of Tuberculosis and Poliomyelitis Patients

Single	34	25	66	55	180
Married	34	31	–	1	66
Widowed	3	6	–	–	9
Divorced	–	1	–	–	1
Separated	1	–	–	–	1
	72	63	66	56	257

Table 3.—*Ages of Patients Admitted*

Tuberculosis Patients

	Adults		Children		Totals
	Males	Females	Males	Females	
Under 5 years	–	–	5	5	10
5 to 9 "	–	–	3	9	12
10 " 14 "	–	–	6	6	12
15 " 19 "	–	–	25	13	38
20 " 29 "	21	26	3	3	53
30 " 39 "	19	14	–	–	33
40 " 49 "	8	8	–	–	16
50 " 59 "	8	6	–	–	14
60 " 69 "	3	3	–	–	6
70 and over	–	–	–	–	–
	59	57	42	36	194
Average age 26 years					

Poliomyelitis Patients

Under 5 years	–	–	–	1	1
5 to 9 "	–	–	–	3	3
10 " 14 "	–	–	14	10	24
15 " 19 "	–	–	10	6	16
20 " 29 "	8	5	–	–	13
30 " 39 "	5	1	–	–	6
40 " 49 "	–	–	–	–	–
50 " 59 "	–	–	–	–	–
60 " 69 "	–	–	–	–	–
70 and over	–	–	–	–	–
	13	6	24	20	63
Average age 17 years					

Total of Tuberculosis and Poliomyelitis Patients

Under 5 years	–	–	5	6	11
5 to 9 "	–	–	3	12	15
10 " 14 "	–	–	20	16	36
15 " 19 "	–	–	35	19	54
20 " 29 "	29	31	3	3	66
30 " 39 "	24	15	–	–	39
40 " 49 "	8	8	–	–	16
59 " 59 "	8	6	–	–	14
60 " 69 "	3	3	–	–	6
70 and over	–	–	–	–	–
	72	63	66	56	257

Average age 24 years.

TABLE 4.—*Nativity and Parentage of Patients Admitted*

Tuberculosis Patients

Place of Nativity	Adults						Children						Totals		
	Males			Females			Males			Females					
	Patient	Father	Mother	Patient	Father	Mother	Patient	Father	Mother	Patient	Father	Mother	Patient	Father	Mother
United States:															
Massachusetts	23	5	7	29	5	6	38	12	12	32	12	17	122	34	42
Other New England States	3	2	2	2	3	3	1	1	3	2	3	3	8	9	11
Other States	6	3	4	5	2	3	2	3	2	2	2	2	15	10	11
	32	10	13	36	10	12	41	16	17	36	17	22	145	53	64
Other Countries:															
Africa	–	–	–	–	–	–	–	1	–	–	–	–	–	1	–
Albania	–	–	–	–	–	–	–	1	1	–	–	–	–	1	1
Austria	–	–	–	–	1	1	–	–	–	–	–	–	–	1	1
Canada	5	7	8	8	11	10	–	4	5	–	6	6	13	28	29
England	2	1	2	–	–	–	–	2	–	–	2	1	2	5	3
Germany	–	1	–	–	1	–	–	–	–	–	–	–	–	2	–
Greece	1	1	1	1	1	1	–	–	–	–	–	–	2	2	2
Holland	1	1	1	–	–	–	–	–	–	–	–	–	1	1	1
Hungary	–	–	–	–	–	–	–	–	–	–	1	1	–	1	1
Italy	4	11	11	3	5	5	1	7	7	–	2	2	8	25	25
India	–	2	–	–	–	–	–	–	–	–	–	–	–	2	–
Ireland	–	3	2	4	19	17	–	1	1	–	2	2	4	25	22
Lithuania	1	1	1	–	1	–	–	–	–	–	–	–	1	2	1
Norway	1	1	1	–	–	–	–	–	–	–	–	–	1	1	1
Poland	1	3	3	–	1	2	–	3	3	–	2	1	1	9	9
Porto Rico	–	–	–	–	–	–	–	1	1	–	–	–	–	1	1
Portugal	5	6	6	1	4	4	–	3	3	–	–	–	6	13	13
Russia	2	4	4	2	2	2	–	2	3	–	–	–	4	8	9
Scotland	2	1	2	2	1	2	–	–	–	–	–	–	4	2	4
Sweden	2	2	2	–	–	–	–	–	–	–	1	1	2	3	3
Syria	–	1	1	–	–	–	–	1	1	–	–	–	–	2	2
Wales	–	1	–	–	–	–	–	–	–	–	–	–	–	1	–
West Indies	–	–	–	–	–	–	–	–	–	–	1	–	–	1	–
Unknown	–	2	1	–	–	1	–	–	–	–	2	–	–	4	2
	59	59	59	57	57	57	42	42	42	36	36	36	194	194	194

Poliomyelitis Patients

United States:															
Massachusetts	9	5	2	6	5	6	22	13	14	20	10	11	57	33	33
Other New England States	1	1	3	–	1	–	1	1	1	–	2	1	2	5	5
Other States	2	2	1	–	–	–	1	–	–	–	–	1	3	2	2
	12	8	6	6	6	6	24	14	15	20	12	13	62	40	40
Other Countries:															
Armenia	–	–	–	–	–	–	–	–	–	–	1	–	–	1	–
Canada	–	3	4	–	–	–	–	3	2	–	1	2	–	7	8
England	–	–	–	–	–	–	–	–	–	–	1	–	–	1	–
Italy	–	–	–	–	–	–	–	1	1	–	2	2	–	3	3
Ireland	1	2	2	–	–	–	–	1	1	–	1	1	1	4	4
Poland	–	–	–	–	–	–	–	2	2	–	–	–	–	2	2
Portugal	–	–	–	–	–	–	–	3	2	–	11	1	–	4	3
Scotland	–	–	1	–	–	–	–	–	–	–	–	–	–	–	1
Sweden	–	–	–	–	–	–	–	–	1	–	–	–	–	–	1
Unknown	–	–	–	–	–	–	–	–	–	–	1	1	–	1	1
	13	13	13	6	6	6	24	24	24	20	20	20	63	63	63

Table 5.—*Residence of Patients Admitted*

Tuberculosis Patients

	Adults	Children	Totals
Agawam	–	2	2
Andover	2	–	2
Arlington	1	1	2
Ashland	1	–	1
Bellingham	–	1	1
Boston	26	17	43
Braintree	–	1	1
Brockton	3	1	4
Brookline	1	1	2
Cambridge	1	4	5
Cataumet	1	–	1
Chelsea	4	1	5
Chester	1	–	1
Cliftondale	2	–	2
Dartmouth	–	1	1
Dracut	–	1	1
East Bridgewater	–	1	1
Everett	1	–	1
Fairhaven	1	–	1
Fall River	1	–	1
Falmouth	–	1	1
Fiskdale	1	–	1
Fitchburg	1	1	2
Framingham	2	–	2
Gardner	1	–	1
Gloucester	1	–	1
Haverhill	2	1	3
Hingham	1	–	1
Holyoke	1	–	1
Hopedale	–	2	2
Lawrence	3	1	4
Leominster	1	–	1
Lexington	1	1	2
Lowell	1	2	3
Lynn	2	–	2
Malden	2	1	3
Marblehead	1	–	1
Mattapoisett	–	1	1
Medford	3	2	5
Melrose	–	2	2
Methuen	1	1	2
Neponset	1	1	2
New Bedford	9	3	12
Newburyport	2	1	3
New Salem	–	1	1
Newton	–	1	1
Orange	1	–	1
Peabody	1	2	3
Pittsfield	–	2	2
Plymouth	–	1	1
Quincy	2	–	2
Randolph	1	1	2
Raynham	1	–	1
Revere	2	1	3
Salem	3	2	5
Saugus	2	1	3
Somerville	4	4	8
Southbridge	–	1	1
Springfield	2	1	3
Swampscott	–	1	1
Swansea	–	1	1
Taunton	1	3	4
Wakefield	2	–	2
Walpole	1	–	1
Waltham	6	–	6
Ware	1	–	1
Watertown	2	–	2
Westfield	–	1	1
Worcester	1	1	2
	116	78	194

Poliomyelitis Patients

	Adults	Children	Totals
Adams	–	1	1
Amesbury	2	–	2
Arlington	–	1	1
Bellingham	–	1	1
Boston	1	3	4
Braintree	1	–	1
Brookline	–	1	1
Chelmsford	1	2	3
Cotuit	–	1	1
Dennisport	–	1	1
Dighton	–	2	2
Eastham	–	1	1
East Longmeadow	1	–	1
Edgartown	–	1	1
Everett	–	1	1
Fall River	1	2	3
Gloucester	–	1	1
Hanson	–	2	2
Haverhill	1	4	5
Huntington	1	–	1
Lowell	1	2	3
Ludlow	1	–	1
Lynn	2	1	3
Marlborough	–	1	1
Medford	–	1	1
Methuen	–	1	1
Montague	1	–	1
New Bedford	–	1	1
Newburyport	–	1	1
Oak Bluffs	–	2	2
Pittsfield	1	–	1
Salem	–	2	2
Saugus	–	1	1
Somerville	2	–	2
Taunton	–	1	1
Templeton	1	–	1
Wakefield	–	1	1
Walpole	–	1	1
Watertown	–	1	1
Westborough	–	1	1
Woburn	1	–	1
Worcester	–	1	1
	19	44	63

TABLE 6.—*Diagnosis on Admission*

Tuberculosis Patients

	Adults		Children		Totals	Percentages
	Males	Females	Males	Females		
One Lesion						
Tb. abscess, ischio-rectal	–	1	–	–	1	.51
Tb. adenitis, cervical	4	8	3	6	21	10.82
Tb. adenitis, inguinal	–	–	1	–	1	.51
Tb. adenitis, mesenteric	–	–	1	2	3	1.54
Tb. ankle	1	–	–	1	2	1.03
Tb. dactylitis	–	–	–	1	1	.51
Tb. epididymitis	1	–	–	–	1	.51
Tb. hip	2	–	1	–	3	1.54
Tb. knee	1	–	1	–	2	1.03
Tb. maxilla	–	–	–	1	1	.51
Tb. nephritis	2	1	–	–	3	1.54
Tb. ophthalmia	1	2	–	6	9	4.63
Tb. orchitis	1	–	–	–	1	.51
Tb. pericarditis	–	–	1	–	1	.51
Tb. peritonitis	2	4	2	–	8	4.12
Pulmonary tuberculosis	–	1	–	–	1	.51
Tb. rib	–	1	–	–	1	.51
Tb. salpingitis	–	2	–	–	2	1.02
Tb. shoulder	1	1	–	–	2	1.03
Tb. spine	4	2	9	3	18	9.27
	20	23	19	20	82	–
One Lesion with X-ray Evidence of Pulmonary Infection						
Tb. adenitis, cervical	–	1	1	1	3	1.54
Tb. colitis	–	–	1	–	1	.51
Tb. fistula in ano	–	–	1	–	1	.51
Tb. hip	1	–	–	1	2	1.03
Tb. nephritis	1	2	–	–	3	1.54
Tb. peritonitis	–	2	–	–	2	1.03
Tb. shoulder	1	–	–	–	1	.51
Tb. spine	2	2	1	1	6	3.09
	5	7	4	3	19	–
One Lesion with Evidence of Pulmonary Tuberculosis Inactive						
Tb. adenitis, cervical	–	1	–	–	1	.51
Tb. foot	–	–	–	1	1	.51
Tb. knee	3	–	–	–	3	1.54
Tb. nephritis	–	1	–	–	1	.51
Tb. peritonitis	1	1	1	–	3	1.54
Tb. sacro-iliac	–	1	–	–	1	.51
Tb. spine	2	3	–	–	5	2.57
Tb. tenosynovitis	1	–	–	–	1	.51
	7	7	1	1	16	–
One Lesion with Pulmonary Tuberculosis Active						
Tb. dactylitis	–	–	1	–	1	.51
Tb. nephritis	1	–	1	–	2	1.03
Tb. ophthalmia	–	1	–	–	1	.51
Tb. sacro-iliac	–	1	–	–	1	.51
Tb. spine	1	1	–	–	2	1.03
	2	3	2	–	7	–
Two Lesions						
Tb. adenitis, mesenteric and cervical	–	–	1	–	1	.51
Tb. ankle; Tb. hip	–	–	1	–	1	.51
Tb. cystitis; Tb. nephritis	–	1	1	1	3	1.54
Tb. dactylitis; Tb. foot	–	–	1	–	1	.51
Tb. epididymitis; Tb. seminal vesicle	–	–	1	–	1	.51
Tb. ophthalmia bilateral	3	3	–	–	6	3.09
Tb. orchitis; Tb. spine	1	–	–	–	1	.51
Tb. salpingitis; Tb. endometritis	–	1	–	–	1	.51
Tb. salpingitis; Tb. peritonitis	–	–	–	1	1	.51
Tb. skin; Tb. adenitis, cervical	1	–	–	–	1	.51
Tb. spine; Tb. knee	–	–	–	1	1	.51
	5	5	5	3	18	–

TABLE 6.—*Diagnosis on Admission*—(Continued)

Tuberculosis Patients

	Adults		Children		Totals	Percentages
	Males	Females	Males	Females		
Two Lesions with X-ray Evidence of Pulmonary Infection						
Tb. adenitis, cervical; Tb. hip	–	–	1	–	1	.51
Tb. nephritis bilateral	1	–	–	–	1	.51
Tb. nephritis; Addison's disease	–	–	1	–	1	.51
Tb. nephritis; Tb. epididymitis	1	–	–	–	1	.51
Tb. orchitis; Tb. epididymitis	1	–	–	–	1	.51
Tb. peritonitis; Tb. salpingitis	–	1	–	–	1	.51
	3	1	2	–	6	–
Two Lesions with Evidence of Pulmonary Tuberculosis Inactive						
Tb. nephritis; Tb. epididymitis	1	–	–	–	1	.51
	1	–	–	–	1	–
Three Lesions						
Tb. Adenitis, cervical; axillary; and inguinal	–	–	2	–	2	1.03
Tb. cystitis; Tb. nephritis; Tb. spine	–	1	–	–	1	.51
Tb. nephritis bilateral; Tb. adenitis, cervical	1	–	–	–	1	.51
Tb. nephritis bilateral; Tb. cystitis	–	2	–	–	2	1.03
Tb. nephritis; Tb. spine; Tb. knee	1	–	–	–	1	.51
	2	3	2	–	7	–
Three Lesions with X-ray Evidence of Pulmonary Infection						
Tb. adenitis, cervical; axillary; Tb. mastitis	–	1	–	–	1	.51
Tb. salpingitis bilateral; Tb. peritonitis	–	1	–	–	1	.51
Tb. skin; Tb. adenitis, cervical; Tb. tenosynovitis	–	1	–	–	1	.51
Tb. sternum; Tb. dactylitis; Tb. spine	–	–	–	1	1	.51
	–	3	–	1	4	–
Three Lesions with Evidence of Pulmonary Tuberculosis Inactive						
Tb. hip; Tb. tenosynovitis; Tb. wrist	1	–	–	–	1	.51
Tb. nephritis; Tb. epididymitis; Tb. spine	1	–	–	–	1	.51
	2	–	–	–	2	–
Three Lesions with Pulmonary Tuberculosis Active						
Tb. adenitis, cervical; Tb. spine; Tb. rib	–	–	1	–	1	.51
	–	–	1	–	1	–
Four Lesions						
Tb. hip; Tb. shoulder; Tb. spine; Tb. wrist	–	–	–	1	1	.51
Tb. nephritis; Tb. epididymitis bilateral; Tb. meningitis	1	–	–	–	1	.51
	1	–	–	1	2	–
Four Lesions with X-ray Evidence of Pulmonary Infection						
Tb. salpingitis bilateral; Tb. peritonitis; Tb. adenitis, mesenteric	–	–	–	1	1	.51
	–	–	–	1	1	–

TABLE 6.—*Diagnosis on Admission* (Concluded)

Tuberculosis Patients

	Adults		Children		Totals	Per-centages
	Males	Females	Males	Females		
Four Lesions with Evidence of Pulmonary Tuberculosis Inactive						
Tb. elbow; Tb. adenitis, cervical and inguinal; Tb. spine	1	–	–	–	1	.51
	1	–	–	–	1	–
Five Lesions with Evidence of Pulmonary Tuberculosis Inactive						
Tb. nephritis; Tb. epididymitis bilateral; Tb. hip; Tb. shoulder	1	–	–	–	1	.51
Tb. greater trochanter; Tb. nephritis; Tb. orchitis; Tb. epididymitis; Tb. arm	1	–	–	–	1	.51
	2	–	–	–	2	–
Non-Tuberculous						
Abdomen	–	–	–	1	1	.51
Arthritis	1	–	–	–	1	.51
Foot	–	1	–	–	1	.51
Hip	–	–	1	–	1	.51
Ischium	1	–	–	–	1	.51
Knee	–	–	1	1	2	1.03
Nephritis	–	1	–	–	1	.51
Peritonitis	–	–	–	1	1	.51
Sacro-iliac	1	–	–	–	1	.51
Spine	–	1	2	–	3	1.54
Tibia	–	–	1	–	1	.51
Wrist	–	–	–	1	1	.51
Unclassified	5	2	1	2	10	5.15
	8	5	6	6	25	–

Poliomyelitis Patients

Anterior Poliomyelitis						
Stage II	1	1	1	1	4	6.35
Stage III	2	1	2	4	9	14.29
Stage IV	9	3	19	14	45	71.43
	12	5	22	19	58	–
Anterior Poliomyelitis with X-ray Evidence of Pulmonary Infection						
Stage IV	1	–	1	–	2	3.17
	1	–	1	–	2	
Non-Poliomyelitis	–	1	1	1	3	4.76
	–	1	1	1	3	–

TABLE 7.—*Condition on Discharge*

Tuberculosis Patients

Arrested	22	19	27	27	95	42.04
Apparently arrested	2	7	–	1	10	4.42
Quiescent	20	7	7	3	37	16.37
Improved	9	5	2	3	19	8.41
Unimproved	10	8	4	–	22	9.73
Deaths	8	2	1	1	12	5.31
Not considered	5	5	1	–	11	4.87
Non-tuberculous	4	5	7	4	20	8.85
	80	58	49	39	226	

TABLE 7.—*Condition on Discharge* — (Continued)

Poliomyelitis Patients

	Adults		Children		Totals	Per-centages
	Males	Females	Males	Females		
Improved	7	3	15	9	34	7.73
Unchanged	–	–	3	3	6	1.36
Deaths	–	–	1	–	1	.23
Non-poliomyelitis	–	1	1	1	3	.68
	7	4	20	13	44	

Total of Tuberculosis and Poliomyelitis Patients

Arrested	22	19	27	27	95	35.19
Apparently arrested	2	7	–	1	10	3.70
Quiescent	20	7	7	3	37	13.70
Improved	16	8	17	12	53	19.63
Unimproved	10	8	4	–	22	8.15
Unchanged	–	–	3	3	6	2.22
Deaths	8	2	2	1	13	4.81
Not considered	5	5	1	–	11	4.07
Non-tuberculous	4	5	7	4	20	7.41
Non-poliomyelitis	–	1	1	1	3	1.11
	87	62	69	52	270	

TABLE 8.—*Deaths*

Tuberculosis Patients

	Duration of Disease				Totals	Length of Residence				
	Adults		Children			Adults		Children		Total
	Males	Fe-males	Males	Fe-males		Males	Fe-males	Males	Fe-males	
Less than 1 month	–	–	–	–	–	1	–	1	–	2
1 to 2 months	–	–	–	–	–	1	2	–	–	3
2 to 3 "	–	–	–	–	–	1	–	–	–	1
3 to 4 "	–	–	–	–	–	2	–	–	–	2
4 to 5 "	1	–	–	–	1	–	–	–	–	–
5 to 6 "	–	–	–	–	–	1	–	–	–	1
6 to 7 "	–	–	–	–	–	–	–	–	–	–
7 to 8 "	–	–	–	–	–	–	–	–	–	–
8 to 9 "	–	–	–	–	–	–	–	–	–	–
9 to 10 "	–	–	–	–	–	–	–	–	–	–
10 to 12 "	–	–	–	–	–	–	–	–	–	–
12 to 18 "	1	–	–	–	1	–	–	–	–	–
18 to 24 "	–	–	–	–	–	–	–	–	–	–
Over 2 years	6	2	1	1	10	2	–	–	1	3
	8	2	1	1	12	8	2	1	1	12

Poliomyelitis Patients

3 to 4 months	–	–	–	–	–	–	–	1	–	1
18 to 24 "	–	–	1	–	1	–	–	–	–	–
	–	–	1	–	1	–	–	1	–	1

TABLE 9.—*Causes of Death*

Tuberculosis Patients

	Adults		Children		Totals
	Males	Females	Males	Females	
Tb. colitis; Tb. adenitis, mesenteric; Pulmonary embolism	–	1	–	–	1
Tb. hip; Tb. nephritis	1	–	–	–	1
Tb. nephritis	2	–	–	–	2
Tb. nephritis; Tb. adenitis, cervical and mesenteric	1	–	–	–	1
Tb. nephritis; Tb. epididymitis; Tb. spine; Tb. hip	1	–	–	–	1
Tb. ophthalmia; peritonitis; appendicial abscess	–	1	–	–	1
Tb. peritonitis	1	–	–	–	1
Tb. peritonitis; Tb. enteritis; Pulmonary tuberculosis	–	–	1	–	1
Tb. sacro-iliac; Tb. adenitis, cervical	1	–	–	–	1
Tb. spine; Tb. nephritis amyloidosis	–	–	–	1	1
Tb. spine; pulmonary tuberculosis	1	–	–	–	1
	8	2	1	1	12

Poliomyelitis Patients

Anterior poliomyelitis stage III; Post-poliomyelitic respiratory failure	–	–	1	–	1

Financial Report, Lakeville State Sanatorium, 1937

To the Department of Public Health:

I respectfully submit the following report of the finances of this institution for the fiscal year ending November 30, 1937.

STATEMENT OF EARNINGS

Board of patients:			
Private	$2,292 00		
Cities and towns	122,838 60		
		$125,130 60	
Personal services:			
Reimbursement from Board of Retirement	118 64		
Sales:			
Food	656 24		
Furniture and household supplies	15 68		
Medical and general care	49 50		
Farm	634 80		
Garage, stable and grounds	83 89		
Repairs, ordinary	240 65		
Arts and crafts sales	32 61		
Land conservation	101 80		
Total sales		$1,815 17	
Miscellaneous:			
Transfer from Lakeville Water Supply Fund	72 00		
Total, miscellaneous		72 00	
Total earnings for the year			$127,136 41
Total cash receipts reverting and transferred to State Treasurer			$149,405 82
Accounts receivable outstanding Dec. 1, 1936		$47,407 51	
Accounts receivable outstanding Nov. 30, 1937		$25,138 10	
Accounts receivable decreased			$22,269 41

Maintenance Appropriation

Balance from previous year, brought forward		$5,275 49
Appropriation, current year	$336,820 00	
	6,750 00	
		$343,570 00
Total		$348,845 49
Expenditures as follows:		
Personal services	$212,458 91	
Food	40,691 93	
Medical and general care	13,058 72	
Farm	21,569 79	
Heat, light and power	16,710 12	
Garage, stable and grounds	3,481 26	
Travel, transportation and office expenses	3,794 78	
Religious instruction	1,410 00	
Clothing and materials	924 85	
Furnishings and household supplies	15,365 45	
Repairs ordinary	3,814 55	
Repairs and renewals	8,368 97	
Total maintenance expenditures		$341,649 33
Balance of maintenance appropriation, Nov. 30, 1937		7,196 16
Estimated outstanding liabilities, Nov. 30, 1937		$5,069 73

Special Appropriations

		847 67
Balance December 1, 1936, brought forward		$4,023 36
Appropriations for current year		5,150 00
Total		$10,021 03
Expended during the year (see statement below)	$2,998 95	
Reverting to Treasury of Commonwealth	* 970 25	
(Star balances below that are reverting)		3,969 20
Balance November 30, 1937, carried to next year		$6,051 83

Appropriation	Act or Resolve	Total Amount Appropriated	Expended during Fiscal Year	Total Expended to Date	Balance at End of Year
Fire protection and sprinklers	249–1934	–	–	–	–
	304–1936	–	–	–	–
	434–1937	$5,100 00	$1,941 71	$4,067 45	$1,032 55
Improved Water Supply System	304–1936	2,200 00	604 44	1,311 82	888 18
Occupational Therapy Shop					
Construction	304–1936	4,500 00	419 15	4,378 69	121 31*
Equipment	304–1936	400 00	14 75	398 73	1 27*
Sewage Beds	434–1937	4,150 00	18 90	18 90	4,131 10
P.W.A. Docket 1354–Mass. State Project H-1	1934	5,000 00	–	4,152 33	847 67*
		$21,350 00	$2,998 95	$14,327 92	$7,022 08
*Reverting	–	–	–	–	970 25
					$6,051 83

Per Capita

During the year the average number of patients has been		281 0465
Total cost of maintenance	$341,649 33	
Equal to a weekly per capita cost of (52 weeks to year)	23 3775	
Total receipts for the year	149,405 82	
Equal to a weekly per capita of	10 2239	
Total net cost of maintenance for year (total maintenance less total receipts)		$192,243 51
Net weekly per capita	13 1536	

Respectfully submitted,

Florence S. Monroe,
Treasurer.

Inventory, Lakeville State Sanatorium

GRAND SUMMARY SHEET

November 30, 1937

Real Estate

Land—251.61 acres	$18,065 00	
Buildings	486,103 31	
Betterments (additions and improvements)	171,301 56	
Total, Real Estate		$675,469 87

Personal Property Undistributed Supplies

(Total of Departmental Sheets)

Travel, transportation and office expenses	$358 58	
Food	6,418 31	
Clothing and materials	2 73	
Furnishings and household supplies	1,418 76	
Medical and general care	2,477 09	
Heat, light and power	1,834 43	
Farm	112 40	
Garage, stable and grounds	117 86	
Repairs	2,447 35	
Total		$15,187 51

Personal Property Distributed Supplies

(Total of Departmental Sheets)

Travel, transportation and office expenses		$2,521 23	
Clothing and materials		1,005 72	
Furnishings and household supplies		48,418 06	
Medical and general care		23,734 02	
Heat, light and power		111 45	
Farm:			
Livestock	$20,037 50		
All other	4,227 98		
		24,265 48	
Garage, stable and grounds		4,620 10	
Repairs		3,511 78	
Total			$108,187 84

Grand Summary

Real Estate—Total	$675,469 87	
Personal Property—Undistributed Supplies, Total	15,187 51	
Personal Property—Distributed Supplies, Total	108,187 84	
Total		$798,845 22

NORTH READING STATE SANATORIUM

Resident Officers

Carl C. MacCorison, M.D., *Sanatorium Superintendent.*
Earle C. Willoughby, M.D., *Assistant Superintendent.*
Gerald H. Caron, M.D., *Assistant Physician.*
Anna H. Maxwell, M.D., *Assistant Physician.*
Ruth C. Warwick, M.D., *Assistant Physician*
James H. Powers, D.M.D., *Dentist.*
Ethel M. Knight, *Institution Treasurer.*
Ellen M. Bent, R.N., *Principal, School of Nursing.*
Elizabeth Haslett, *Head Housekeeper.*
Beulah F. Philbrook, *Head School Teacher.*
J. Ellis Doucette, *Sanatorium Steward.*
Daniel J. Scott, *Chief Power Plant Engineer.*
Edward J. Leary, *Head Farmer.*

Non-Resident Officers

Edward D. Churchill, M.D., *Consultant, Thoracic Surgeon*
Zabdiel Adams, M.D., *Consultant, Orthopedic Surgeon.*
Halsey B. Loder, M.D., *Consultant, General Surgeon.*
Harold L. Higgins, M.D., *Consultant, Pediatrician.*
Thomas Odoneal, M.D., *Consultant, Opthalmologist.*
Charles W. DeWolfe, M.D., *Consultant, Laryngologist.*
Austin W. Cheever, M.D., *Consultant, Dermatologist.*

Report of the Superintendent

To Henry D. Chadwick, M.D., *Commissioner, Department of Public Health:*

I have the honor of submitting the twenty-seventh annual report of the North Reading State Sanatorium for the year ending November 30, 1937.

Financial Statement

During the year there has been expended for maintenance $271,526.23, a gross weekly per capita cost of $20.7867. There has been expended $9,589.50 for special appropriations during 1937.

There has been collected from miscellaneous sources $80,235.95 (the total of all collections). Deducting this amount from the gross maintenance expenses leaves a net expense of $191,290.28. The net weekly per capita cost was $14.6444. There has been collected from private funds $2,095.35; cities and towns $76,842.00; 19 cases (including 11 from Division of Child Guardianship) were supported by private funds; 297 by cities and towns and 78 wholly by the state.

Population

There were 236 patients at the beginning of the year and 251 at the close of the year. The largest number at any one time was 273 and the smallest number present at any one time was 226. The daily average number of patients was 251.20 as against 249.97 last year. There were 224 patients admitted during the year, nine more than last year.

There were 189 cases admitted from cities and towns of over 25,000 population and 35 cases from cities and towns under 25,000. The average age of patients was 9.18, which is a little below that of last year, owing to the fact that there has been a larger number of patients admitted under 4 years of age.

Including deaths, there were 209 patients discharged, and the average duration of residence was 16 months and 14 days. Of those discharged, 180 patients gained 3,069 lbs., an average gain of 17 lbs. per person.

Of the discharges 8 were apparently well; 114 arrested; 15 apparently arrested; 7 quiescent; 26 improved; 28 unimproved; 1 not considered. There were 10 deaths, six less than last year.

There were 91,672 hospital days.

Average number of officers and employees: Males, 75.16; females, 104.50; Total, 179.66.

Medical Report

There has been no change in our medical treatment. We are still resorting more and more to collapse therapy. Seventy children received artificial pneumothorax during the year. Refills were given to 1,439; of this number, 149 were given to ex-patients and employees. Four patients had pneumolysis performed; 5 had phrenic nerve operation; 6 had lipiodol injections; 1 had thoracoplasty; 2 thoracoscopy; and 1 exploratory thoracotomy; also 1 pneumonectomy.

We had one case of scarlet fever during the year and 22 patients developed chicken pox in March and April.

Eleven eye, ear and nose clinics were held by Drs. Odoneal and DeWolfe. One hundred and thirteen children were referred to these clinics; 41 were fitted to glasses. Tonsils and adenoids were removed from 19 patients. One patient had a direct laryngoscopy.

Numerous consultation clinics were held with our consultants, Drs. Cheever, Churchill and Higgins. On numerous occasions, Dr. Richard Norton has kindly offered help and suggestion on difficult dental cases; also Dr. William D. MacIntosh.

We have continued with our monthly consultation clinics and our out-patient work has increased. Figures for the out-patient work are given in the following tables:

	Negative		Suspicious		Positive		Total
	New	Re-ex.	New	Re-ex.	New	Re-ex.	
Out-patients	0	6	975	728	73	279	2,061

School clinics were held in Haverhill, Methuen, Lawrence, Lowell, Cambridge, Andover, Tewksbury, Wilmington, North Reading and Reading. The total enrollment of these schools in the 7th, 9th and 11th grades was 16,283. The number tested was 9,506 or 58 per cent. Fourteen per cent were reactors. There were 1,431 x-rayed. Forty-two received a physical examination. The findings were

Adult type tuberculosis	1
Adult type suspicious	7
Childhood type tuberculosis	62
Listed for observation	114

Dr. Olive A. Cooper of the Department of Mental Hygiene, together with the psychologist, Miss Culbert, has held monthly clinics during the year.

Institutional Activities

Lectures on childhood type tuberculosis and allied subjects were delivered before nurses of the New England Sanitarium, the Malden Hospital, the Harvard School of Public Health, Dr. Higgins' post graduate clinic and Dr. Robert Nichols' class on Internal Medicine. In addition, health meetings were held by the Southern Middlesex Health Association and the Men's Club of Wilmington.

Two articles for radio broadcast were written by the Superintendent during the year.

Personnel Changes

Dr. Rufus M. Little resigned on August 14, 1937, to accept a position as Assistant Physician at the Rhode Island State Sanatorium, Wallum Lake, R. I. His place was taken by Dr. Ruth C. Warwick.

Improvements and Changes

The new storehouse was completed in the early spring.

The employes' dining room was enlarged. Improvements were made in sewage disposal and water supply.

Additional sprinkler heads were installed in the attics of the male employes' building, administration building annex, chapel and nurses' dormitory, school building and dormitory.

An exhaust fan was installed in the laundry and the diet kitchens of East and West wards.

Extensive repairs and alterations were made to the refrigerating system, and new refrigerating equipment was installed to take care of ice cream.

Alterations were made in the laundry and a new press installed.

The 100,000 gallon water tank was painted inside and out.

Repairs were made to the roofs of East and West wards. General repairs were made to the roadway and parking space and additional walks laid down out of the same appropriation.

Recommendations

A nurses' dormitory to house fourteen night nurses is still needed.

The hen houses and piggery are badly in need of reshingling and an additional appropriation is needed for painting.

We are badly in need of a 1–200 G.P.M. self priming horizontal pump and equipment for domestic water supply; a 1– 6″ compound inflow meter; also a new pump for the 25,000 gallon tank, and a concrete pit to house the meter and check valve.

Acknowledgments

I wish to thank the many friends of the institution who have contributed so generously to the happiness of the children, both in gifts and in entertainments.

I am deeply indebted to the clergymen and personnel of the Sanatorium for their loyal cooperation during the year; and in closing may I express my gratitude to you and the Director of the Division of Tuberculosis for your support and counsel.

Respectfully,

Carl C. MacCorison, M.D.,
Superintendent

Laboratory Report

	Number
Blood	
1. Clinical Pathology	
R.B.C. counts	298
W.B.C. counts and differential	744
Haemoglobin	700
Sedimentation test	676
Coagulation	20
2. Chemistry:	
Sugar	14
3. Bacteriology and Serology:	
Widal test	104
Blood for Wasserman and Hinton	39
4. Sputum:	
Smears	1,330
Concentration	121
Cultures	22
Pleural Fluids:	
Cultures	5
Smears	29
Spinal Fluids:	
Cell counts	2
Chemical	2
Urine:	
Routine chemical and microscopic	1,685
Special chemical	10
Kidney function test	1
Cultures	1
Feces:	
Occult blood	2
Ova	6
Stomach contents:	
Tubercle bacilli	57
Pathology:	
Pus smears	20
Pus cultures	15
Nose and throat and mouth smears and cultures	24
Babcock test	52
Bacteria-counts for milk	52
Total	6,031

Dental Report

Prophylactic treatments, 457; fillings (permanent teeth), 597; fillings (temporary teeth), 352; extractions (permanent teeth), 494; extractions (temporary teeth), 576; treatments, 209; restorations, 6; x-rays, 279; irrigations, 108; visits, 3,062; new patients, 267; dental examinations, 3,062; total number operating hours, 1,627.

School Report

Throughout the year ending December 1, 1937, the teachers in our school have endeavored to keep pace with the scholastic needs of the patients. Miss Dolan and Miss Brink resigned in June. We were very fortunate in getting Miss Eldridge and Miss Collins to take their respective places. In September Miss Labonte resigned and a very efficient teacher in the person of Miss Upton took her place. We now have teachers who are prepared to teach all high school subjects.

There has been a decrease in the number of younger patients. Consequently two important changes have been made. The first and second grades have been combined. This combination has made it possible to resume our kindergarten. For the same reason, the seventh and eighth grades were combined.

The bedside instruction continues to be a very important branch of our educational program. It is here that the patients who are not physically able to attend school are helped to keep up with their grade requirements.

In June fifteen young people received diplomas as certificates of graduation from the eighth grade. This is the largest graduating class in the history of the Sanatorium School. Eight of this number were graduated because of help received in summer school and from bedside instruction.

Incidentally, and in the way of progress, we wish to report that Medieval and Modern History has been introduced into the high school. But the most important advance step which we have taken during the past year is the introduction of new books so that we now have a systematic health education program throughout our school system.

In conclusion may I report that we now have in our institution school one hundred sixty pupils and in addition there are thirty patients who receive instruction in the wards, making a total of one hundred ninety pupils served by our corps of teachers. These young people come from many towns and localities, from diverse conditions of environment and educational background. It is our great problem and our high purpose so to instruct these pupils and guide their mental activities that when fully convalescent they may return to their homes and their local schools and find themselves qualified to carry on successfully.

School Statistics

	Average Daily Attendance	Per cent of Attendance	Total Enrollment
Kindergarten	28.52	93.74	35
Grades I and II	17.27	96.26	22
Grades III and IV	23.04	94.51	38
Grades V and VI	25.49	96.09	41
Grades VII and VIII	28.13	97.68	23
High School	33.59	95.51	41
Entire School	156.04	95.63	200

Table 1.—*Admissions and Discharges*

	Males	Females	Totals
Patients in Sanatorium Dec. 1, 1936	116	120	236
Patients admitted from Dec. 1, 1936, to Nov. 30, 1937, incl.	101	123	224
Patients discharged from Dec. 1, 1936, to Nov. 30, 1937, incl.	92	117	209
Patients remaining in Sanatorium November 30, 1937	125	126	251
Daily average number patients	124.39	126.81	251.20
Deaths (included in number discharged)	3	7	10

TABLE 2.—*Classification on Application Blanks and on Admission.*

	Classification on Application Blanks		Our Classification on Admission		Per Cent	
	1936	1937	1936	1937	1936	1937
Minimal	40	43	28	24	13.02	10.71
Moderately advanced	35	28	11	6	5.11	2.67
Advanced	12	17	20	23	9.30	10.26
Childhood type tuberculosis	89	96	127	140	59.07	62.50
Malnutrition	1	0	7	6	3.25	2.67
No disease	0	0	10	4	4.65	1.79
Pleurisy with effusion	5	1	0	1	–	.45
Bronchiectasis	0	1	4	2	1.85	.89
Empyema	0	0	0	2	–	.89
Lung abscess	1	1	0	0	–	–
Pulmonary tuberculosis	5	2	0	0	–	–
Observation	9	7	0	0	–	–
Bronchial asthma	0	0	2	0	.93	–
Probable tbc. pneumonia	1	0	0	0	–	–
Miliary tuberculosis	1	3	0	1	–	.45
Tracheoadenopathy	1	0	0	0	–	–
Resolving pneumonia	0	0	1	0	.47	–
Chronic rhinitis	0	0	0	1	–	.45
Congenital syphilis	0	0	0	1	–	.45
Tuberculosis of kidneys	0	0	0	1	–	.45
Convalescent lung abscess	0	0	0	1	–	.45
Sickle cell anemia	0	0	0	1	–	.45
Tuberculous adenitis	0	1	0	0	–	–
Tuberculous pleurisy	0	1	0	0	–	–
Tuberculous peritonitis	0	0	0	1	–	.45
Idiocy	0	0	0	1	–	.45
Atelectasis	0	0	0	1	–	.45
Mediastinal tumor	0	0	1	0	.47	–
Pulmonary fibrosis	0	0	1	0	.47	–
Spina bifida	0	0	1	0	.47	–
Congenital heart disease	0	0	1	0	.47	–
Convalescent lobectomy	0	0	1	0	.47	–
Unclassified	15	23	0	0	–	–
Deferred	0	0	0	7	–	3.12
	215	224	215	224	100.	100.

TABLE 3.—*Civil Condition of Patients Admitted*

	Males	Females	Total
Single	101	123	224
Total	101	123	224

TABLE 4.—*Age of Patients Admitted*

	Males	Females	Total	Per Cent
Under 5 years	24	27	51	22.77
5 to 9 years	25	29	54	24.11
10 to 14 years	43	53	96	42.85
15 to 19 years	9	14	23	10.27
20 years and over	0	0	0	–
Average age	8.98	9.31	9.18	–
Total	101	123	224	100.00

TABLE 5.—*Nativity and Parentage of Patients Admitted*

Place of Nativity	Males			Females			Total		
	Patient	Father	Mother	Patient	Father	Mother	Patient	Father	Mother
United States:									
Massachusetts	98	36	45	113	54	69	211	90	114
Other New England States	2	10	3	3	7	4	5	17	7
Other States	1	6	2	3	7	8	4	13	10
	101	52	50	119	68	81	220	120	131
Other Countries:									
Armenia	0	2	2	0	0	0	0	2	2
Austria	0	0	1	0	1	1	0	1	2
Bahamas	0	0	0	0	0	1	0	0	1
Belgium	0	0	0	0	1	0	0	1	0
British West Indies	0	0	0	0	2	1	0	2	1
Canada	0	9	17	1	10	11	1	19	28
Cape Verde Islands	0	1	1	0	0	0	0	1	1
England	0	1	1	0	2	0	0	3	1
Greece	0	1	1	0	1	1	0	2	2
Ireland	0	6	8	1	6	5	1	12	13
Italy	0	12	9	2	16	10	2	28	19
Jamaica	0	1	0	0	0	0	0	1	0
Lithuania	0	1	1	0	1	1	0	2	2
Newfoundland	0	0	0	0	1	0	0	1	0
Norway	0	0	0	0	1	1	0	1	1
Poland	0	6	7	0	3	2	0	9	9
Portugal	0	3	0	0	2	1	0	5	1
Roumania	0	0	1	0	0	0	0	0	1
Russia	0	1	0	0	3	2	0	4	2
Scotland	0	1	0	0	1	2	0	2	2
Sicily	0	1	0	0	0	0	0	1	0
Spain	0	0	0	0	1	1	0	1	1
Syria	0	1	1	0	0	0	0	1	1
Unknown	0	2	1	0	3	2	0	5	3
Total Foreign	0	49	51	4	55	42	4	104	93
Grand Total	101	101	101	123	123	123	224	224	224

TABLE 6.—*Residence of Patients Admitted*

Amesbury	1	Haverhill	4	Natick	1	Townsend	1
Andover	3	Ipswich	2	Needham	1	Uxbridge	1
Arlington	7	Lawrence	9	New Bedford	1	Wakefield	1
Ayer	1	Lexington	1	Newburyport	1	Waltham	5
Beverly	3	Lowell	1	Newton	2	Watertown	3
Boston	75	Ludlow	1	North Reading	1	Wellesley	1
Cambridge	11	Lynn	10	Peabody	2	Winchester	1
Chelsea	8	Malden	3	Quincy	11	Woburn	1
Dartmouth	1	Medford	6	Reading	2		
Everett	5	Melrose	1	Revere	2	Total	224
Fitchburg	9	Methuen	5	Salem	2		
Harwich	1	Milford	1	Somerville	11		
Hatfield	1	Milton	1	Stoneham	2		

TABLE 7.—*Stage of Disease on Admission*

	Males	Females	Total	Percentage
Childhood type tuberculosis	66	74	140	62.50
Minimal	7	17	24	10.71
Moderately advanced	2	4	6	2.67
Advanced	8	15	23	10.26
Miliary tuberculosis	1	0	1	.45
Malnutrition	4	2	6	2.67
No disease	1	3	4	1.79
Bronchiectasis	0	2	2	.89
Empyema	2	0	2	.89
Atelectasis	0	1	1	.45
Convalescent lung abscess	1	0	1	.45
Tuberculous pleurisy with effusion	0	1	1	.45
Tuberculous peritonitis	1	0	1	.45
Tuberculosis of kidneys	0	1	1	.45
Congenital syphilis	1	0	1	.45
Chronic rhinitis	1	0	1	.45
Idiocy	1	0	1	.45
Sickle cell anemia	0	1	1	.45
Deferred	5	2	7	3.12
Total	101	123	224	100.00

TABLE 8.—*Condition on Discharge*

	Males	Females	Total	Percentage
Apparently well	4	4	8	3.82
Arrested	59	55	114	54.59
Apparently arrested	6	9	15	7.17
Quiescent	4	3	7	3.34
Improved	7	19	26	12.44
Unimproved	9	19	28	13.39
Died	3	7	10	4.78
Not considered	0	1	1	.47
Total	92	117	209	100.00

TABLE 9.—*Deaths*

Duration of Disease	Males	Females	Totals	Length of Residence at Sanatorium		
				Males	Females	Totals
Under 1 month	1	0	1	1	0	1
1 to 2 months	0	0	0	0	1	1
2 to 3 months	0	0	0	0	1	1
3 to 4 months	0	0	0	0	2	2
4 to 5 months	0	0	0	0	0	0
5 to 6 months	1	0	1	0	1	1
6 to 7 months	0	1	1	0	0	0
7 to 8 months	0	0	0	0	0	0
8 to 9 months	0	0	0	1	0	1
9 to 10 months	0	0	0	0	0	0
10 to 11 months	1	0	1	0	0	0
11 to 12 months	0	1	1	0	0	0
12 to 18 months	0	2	2	1	0	1
18 to 24 months	0	0	0	0	1	1
Over 2 years	0	3	3	0	1	1
Total	3	7	10	3	7	10

TABLE 10.—*Causes of Death*

	Males	Females	Total
Tubereulosis of lungs	1	6	7
Miliary tuberculosis	1	0	1
Bronchopneumonia	1	0	1
Tuberculosis of meninges and childhood type tuberculosis	0	1	1
Total	3	7	10

Financial Report, North Reading State Sanatorium, 1937

To the Department of Public Health:

I respectfully submit the following report of the finances of this institution for the fiscal year ending November 30, 1937.

STATEMENT OF EARNINGS

Board of patients:			
Private	$2,269 35		
Cities and towns	67,754 00		
		$70,023 35	
Personal services:			
Reimbursement from Board of Retirement		$81 40	
Sales:			
Food	$8 80		
Clothing and materials	98 66		
Furniture and household supplies	41 07		
Medical and general care	67 45		
Heat, light and power	6 25		
Farm	118 53		
Garage, stable and grounds	65 82		
Repairs, ordinary	7 25		
Miscellaneous—junk	362 05		
Total sales		$775 88	
Miscellaneous:			
Rents			
Garages	$405 50		
Total, miscellaneous		$405 50	
Total earnings for the year			$71,286 13
Total cash receipts reverting and transferred to the State Treasurer			$80,235 95
Accounts receivable outstanding Dec. 1, 1937		$13,521 32	
Accounts receivable outstanding Nov. 30, 1936		$22,471 14	
Accounts receivable decreased			$8,949 82

Maintenance Appropriation

Balance from previous year, brought forward		$3,979 69
Appropriation, current year	$280,700 00	
Transferred from special appropriation	1,000 00	
Supplemental appropriation	3,300 00	
		$285,000 00
Total		$288,979 69
Expenditures as follows:		
Personal services	$172,340 35	
Food	44,967 24	
Medical and general care	8,558 03	
Farm	4,193 12	
Heat, light and power	14,048 62	
Garage, stable and grounds	2,483 02	
Travel, transportation and office expenses	2,701 10	
Religious instruction	1,599 72	
Clothing and materials	1,492 32	
Furnishings and household supplies	6,469 47	
Repairs, ordinary	2,964 66	
Repairs and renewals	9,708 58	
Total maintenance expenditures		$271,526 23
Balance of maintenance appropriation, Nov. 30, 1937		17,453 46
Estimated outstanding liabilities, Nov. 30, 1937		$4,592 00

Special Appropriations

Balance December 1, 1936, brought forward		$9,045 66
Appropriations for current year		4,150 00
Total		$13,195 66
Expended during the year (see statement below)		$7,456 17
Transferred to Maintenance Expense	1,000 00	
Reverting to Treasury of Commonwealth	*2,156 33	
(Star balances below that are reverting)		10,612 50
Balance November 30, 1937, carried to next year		$2,583 16

Appropriation	Act or Resolve	Total Amount Appropriated	Expended during Fiscal Year	Total Expended to Date	Balance at End of Year
Improving Water Supply	249–1935	1,500 00	23 00*	1,500 00*	–
Fire Protection and Sprinklers	249–1935 304–1936	5,800 00	1,292 98	3,589 53	$2,210 47
Addition to Storehouse	304–1936	10,500 00	4,819 21	10,500 00*	–
Enlarging Employees' Dining Room	304–1936	2,000 00	2,000 00*	2,000 00	–
Improving Water Supply	234–1937 434	450 00	340 59	340 59	109 41
Improving Sewage System	234–1937	1,400 00	1,136 72	1,136 72	263 28
Improvement of Roads and Parking Spaces	234–1937	1,000 00	1,000 00	1,000 00	Transferred to Maintenance Appropriation Repairs and Renewals
		$22,650 00	$10,612 50	$20,066 84	$2,583 16

Per Capita

During the year the average number of patients has been		251 20
Total cost of maintenance	$271,526 23	
Equal to a weekly per capita cost of (52 weeks to year)	20 7868	
Total receipts for the year	80,235 95	
Equal to a weekly per capita of	6 1425	
Total net cost of maintenance for year (total maintenance less total receipts)		$191,290 28
Net weekly per capita	14 6443	

Respectfully submitted,

Ethel M. Knight,
Treasurer.

Inventory: North Reading State Sanatorium

GRAND SUMMARY SHEET

November 30, 1937.

Real Estate

Land, 115.11 acres	$11,178 00	
Buildings	601,800 15	
Betterments (additions and improvements)	139,447 17	
Total, Real Estate		$752,425 32

Personal Property Undistributed Supplies

(Total of Departmental Sheets)

Travel, transportation and office expenses	$466.23	
Food	5,841 22	
Clothing and materials	2,836 43	
Furnishings and household supplies	3,003 95	
Medical and general care	856 22	
Heat, light and power	926 20	
Farm	259 18	
Garage, stable and grounds	113 02	
Repairs	304 64	
		$14,607 09

Personal Property Distributed Supplies

(Total of Departmental Sheets)

Travel, transportation and office expenses	$4,543 05	
Clothing and materials	4,797 07	
Furnishings and household supplies	79,346 72	
Medical and general care	38,259 49	
Heat, light and power	1 08	
Farm	10,066 44	
Garage, stable and grounds	6,472 11	
Repairs	4,473 12	
Total		$147,959 09

Grand Summary

Real Estate—Total	$752,425 32
Personal Property—Undistributed Supplies, Total	14,607 09
Personal Property—Distributed Supplies, Total	147,959 09
	$914,991 50

RUTLAND STATE SANATORIUM

Resident Officers

Ernest B. Emerson, M.D., *Superintendent.*
Paul Dufault, M.D., *Assistant Superintendent.*
Armand Laroche, M.D., *Senior Physician.*
Gabriel Nadeau, M.D., *Senior Physician.*
Isadore L. Cutler, M.D., *Assistant Physician.*
Oscar Feinsilver, M.D., *Assistant Physician.*
George C. Steele, M.D., *Assistant Physician.*
Gulli Lindh Muller, M.D., *Assistant Physician (Pathologist).*
Delya E. Nardi, R.N., *Principal of the School of Nursing.*
Rena Blanche Nauss, R.N., *Assistant Principal of the School of Nursing.*
Marguerite McNamara, *Dietitian.*
Muriel Krause, *Assistant Dietitian.*
Philip G. Zaramba, *Steward.*
Mary A. Boyle, *Institution Treasurer.*
Harry U. Wendell, *Chief Power Plant Engineer.*
Joseph A. Carroll, *Head Farmer.*
Nora G. O'Connell, *Head Housekeeper.*

Non-Resident Officers

Frank H. Washburn, M.D., *Senior Physician.*
Edward D. Churchill, M.D., *Senior Physician.*
G. Arnold Rice, M.D., *Senior Physician.*
Shields Warren, M.D., *Senior Physician (Pathologist).*
William J. O'Connor, D.M.D., *Dentist.*
Roscoe W. Myers, M.D., *Ophthalmologist.*

Report of the Superintendent

To Dr. Henry D. Chadwick, *Commissioner, Department of Public Health:*

I have the honor to submit the forty-first annual report of the Rutland State Sanatorium for the year ending November 30, 1937.

Financial Report

During the year there has been expended $363,359.25 for maintenance, a gross weekly per capita cost of $19.02. This is an increase of $10,524.00 over the expenditures for 1936, allocated approximately as follows: Personal Services, $5,280.14, due to step increases June 1 and to employment of graduate nurses and attendant nurses in place of student nurses; Food, $3,139.92, an increase in the cost of raw foods; Farm, $936.79, increased consumption of grains; Heat & Other Plant Operation, $2,961.29, an increase in the cost of fuel oils; Repairs & Renewals, $814.97.

There has been expended $1,001.18 from Special Appropriations authorized by Item 601, Acts 1936, and by Item 634, Acts 1937, Installation of Hydrants and Improvement of Water Supply Mains.

There has been collected from Miscellaneous Sources, $160,421.06, an increase of $5,887.26 over the collections of 1936. Deducting the total collections from the gross maintenance expense leaves a net expense of $202,938.19, a net weekly per capita cost of $10.62. There has been collected from private sources $26,156.00; from cities and towns, $89,569.00; from the Tubercular Hospital District of Chelsea, Revere and Winthrop $38,230.97; and by the Attorney General $4,594.37.

Eighty-eight cases were supported wholly or in part from private funds; one hundred and twenty-eight cases by cities and towns; forty-two cases by the Tubercular Hospital District of Chelsea, Revere & Winthrop; seventy-two cases wholly by the State. There were thirty-three cases on which settlement had not been determined.

Population

There were 361 patients in the sanatorium at the beginning of the year, and 362 at the close. The largest number present at one time was 373 and the smallest 361. The daily average number of patients was 367.46, a decrease of 1.34 from last year. There were 272 patients admitted during the year, 26 less than last year; 31 minimal, 85 moderately advanced, 143 far advanced, 3 unclassified, 1 childhood type tuberculosis, 1 spontaneous pneumothorax, 1 bronchiectasis, 1 empyema and lung abscess, 2 lung abscess, 1 lung abscess and polyp of bronchus, and 3 cases of pleurisy. There were 199 admitted from cities and towns of over 25,000 population, and 73 from cities and towns under 25,000 population. The average age of patients admitted was 32.43, an increase of 1.72. Including deaths, there were 271 patients discharged, 32 less than last year. The average duration of residence was 422 days, 45 more than last year. Of those discharged, 161 gained 1,976½ pounds, an average gain of 12.28 pounds per person. Of the discharged, there were 5 arrested cases, 5 more than last year, 12 apparently arrested, 5 more than last year, 133 quiescent, 8 less than last year, 30 improved, 30 unimproved, 1 healed lung abscess, and 12 not considered, the duration of treatment being less than one month. There were 48 deaths, 13 less than last year. There were 134,123 days of treatment, 857 less than last year.

Average number of employees and officers during the year: males 130.39, females 95.41, total 225.80.

Further statistical details are shown in the tables which are a part of this report.

Institutional Activities

The Training School is in its thirtieth year.

Lectures and demonstrations have been given by the medical staff.

The hospital affiliations are:

Cooley Dickinson Hospital	9 months
Boston City Hospital	1 year
Boston Floating Hospital	3 months

The following were awarded diplomas:

Pauline Bielecki
Katherine Morgan
Regina Lamb
Helen Kasuilinos
Ellen Hamilton
Katherine Duff

There are 210 graduates of the school.

There are sixteen student nurses whose graduation during the coming year will mark the closing of the Training School for registered nurses.

We are forced to take this apparent step backward by reason of the impossibility or impracticability of meeting the present requirements for training a registered nurse. In many ways this is to be regretted, not the least of which was the opportunity afforded for vocational training of the physically handicapped but, on the other hand, we shall be relieved of the continual go and come made necessary by the required general hospital affiliations. A very large proportion of our graduates were former patients and after graduation practiced their profession in this or other sanatoria under conditions which made life possible for service and happiness.

In place of the Training School, a one year course has been established for the training of attendant nurses. In some measure this will replace the vocational features of the school and will probably work to our advantage from an administrative point of view.

The student nurses have been replaced by graduates and attendant nurses. Sufficient time has not elapsed to judge accurately as to the ultimate advantages or disadvantages of the new arrangement.

All single rooms have been furnished with adjustable hospital beds.

Oil ranges have been installed in the kitchen, thereby discontinuing the use of one fire in the roasting oven.

Fireproof storeroom alterations for the storing of x-ray films, records and supplies have been completed.

New hardwood floors have been laid in Wards B, C, E and F.

Under the United States Fund, Social Security, duplicate sound equipment has been installed.

Personnel Changes

Dr. Charles K. McCarthy was appointed assistant physician at the Rutland State Sanatorium November 3, 1930, and resigned June 26, 1937, to continue in tuberculosis work, but in a broader field, with the Department of Health, Des Moines, Iowa.

Dr. R. Delphina McCarthy was appointed assistant physician October 5, 1931, and resigned July 23, 1937, to accept a position in the Mount Pleasant State Hospital, Mount Pleasant, Iowa.

Dr. Oscar Feinsilver, a graduate of Tufts Medical School and of the Beth Israel Hospital, was appointed assistant physician July 1, 1937.

Dr. George C. Steele, a graduate of the Harvard Medical School, was appointed Aug. 1, 1936, for a six months' service.

Recommendations

I am again renewing my recommendations as set forth in detail in previous reports for the following new construction: Modern hospital buildings to replace those which are obsolete, fire hazards, and do not meet present day requirements; dormitories for male and female employees now living two or more in a room or allotted outside maintenance.

The foregoing is a large order but I firmly believe that a comprehensive building program should be worked out for the eventual replacement of the present ward buildings.

I recommend the following appropriations: $1,500.00 for further lightning protection; $1,200.00 to replace the domestic water supply pipe on the West Side.

Acknowledgments

It is with sorrow that I record the passing away of Rabbi Zeldner after 8 years of service to those of his faith. In his place Rabbi Jacob Weisenberg of Congregation Shaarai Torah, Worcester, Mass., has been appointed.

In closing, I wish to acknowledge with gratitude the services of our chaplains, The Reverend Robert French, The Reverend Father Sullivan, The Reverend Father Smith and Rabbi Weisenberg, who have assisted in every way possible to make life more livable not only for patients but for employees.

Again, I am grateful for the cooperation and loyalty of every employee, and for your confidence, support and counsel over another year.

Respectfully,
Ernest B. Emerson, M.D.
Superintendent.

Surgical Report

The following is a list of the surgical operations performed at the sanatorium:

Excision of growth on neck	1
Appendectomy	14
Alcohol injection	1
Bronchoscopy	64
Cystoscopy	13
Cystadenectomy	1
Dilatation and curettage	1
Enterostomy	1
Excision of new growth	1
Fulguration of tumor of finger	3
Fulguration of papilloma of forehead	1
Fistulotomy	1
Oleothorax	26
Removal of pigmented wart on wrist	1
Removal of papilloma	1
Removal of ganglion of wrist	1
Oophorectomy right	1
Phrenic emphraxis	64
Intrapleural pneumolysis	70
Bilateral salpingectomy	1
Tonsillectomy	6
High ligation of the saphenous veins	1
	274

Artificial pneumothorax treatments	6,245
Number of patients receiving pneumothorax at the present time	168
Number of patients receiving pneumothorax for the entire year	275
Number of patients receiving oleothorax at the present time	2
Number of patients receiving oleothorax for the entire year	4
Number of patients receiving pneumoperitoneum at the present time	3
Number of out-patients receiving pneumothorax at the present time	51
Number of out-patients receiving pneumothorax for the entire year	61
Aspirations, pleural cavity	194

There were 27 thoracoplasties performed at the Massachusetts General Hospital.

Laboratory Report

Blood

1. Clinical Pathology

Red blood cell count	395
White blood cell count	2,036
Differential count	2,024
Hemoglobin (Hellige)	1,940

Sedimentation test	1,985
Hematocrit	1,985
Icterus index	1,585
Coagulation	147
Van den Bergh	4
Reticulocyte count	9
2. Chemistry	
Sugar (Folin)	157
Non-protein nitrogen	9
Congo red test	8
Chloride	1
3. Bacteriology and Serology	
Culture	5
Blood grouping	25
Guinea pig inoculation	1
Sputum	
Smear for tubercle bacilli	3,022
Concentration test	1,326
Culture for tubercle bacilli	1,431
Guinea pig inoculations	85
Pleural Fluids	
Culture	656
Smear	231
Guinea pig inoculations	3
Spinal Fluids	
Cell count	5
Chemical	5
Guinea pig inoculations	2
Urine	
Routine analysis	842
Special chemical	2,438
Mosenthal test	7
Kidney function (P.S.P.) test	21
Culture	18
Guinea pig inoculations	11
Feces	
Occult blood	20
Tubercle bacilli, ova, etc.	9
Culture	3
Guinea pig inoculation	1
Stomach Contents	
Acidity	1
Concentration test for tubercle bacilli	1
Culture	2
Smear	3
Guinea pig inoculations	9
Bacteriological smears	136
Bacteriological cultures	138
Bacteria count (milk)	18
Babcock test for fat	102
Pathology	
Surgical specimens	47
Autopsies (22.9%)	11
Microscopical sections	315
Total	23,235

Specimens sent to Central Laboratory:

Cultures from urine and feces for bacillus typhosus	160
Blood for Widal test	80
Blood for Hinton test	308
Spinal fluid for Wassermann and Gold Sol	4
Blood for complement fixation test for G. C.	1

Of the total number of patients (362) 92% have had positive sputum; in 6% tubercle bacilli were not found; 2% reported no sputum.

X-rays, in-patient	2,185
X-rays, out-patient	1,139
	3,324
Photographs of x-rays	443
Photographs of prints	491
	934

The following tables indicate the work of the consultation service, out-patient and others:

Number of patients examined at the Gardner, Milford, Southbridge and Athol clinics, 827.

Diagnosis:

Pulmonary tuberculosis	47
Pulmonary tuberculosis and silicosis	1
Non-tuberculous	419
Observation	255
Childhood type	28
Silicosis	1
Bronchiectasis	5
	756

There were re-examined at the consultation clinics during the year the following:

Pulmonary tuberculosis	33
Childhood type tuberculosis	20
	53

Consultation cases to the number of 809 were referred for 936 examinations and 18 ex-patients were referred for 22 follow-up examinations, making a total of 958 examinations at the consultation clinics.

Number of patients examined once, 698; twice, 95; three times, 16.

Number of ex-patients examined once, 15; twice, 2; three times, 1.

Number of physicians referring cases 108.

Sanatorium Out-patient Clinic:

Patients referred by physicians	269
Patients examined at own request	193
	462
Ex-patients examined at own request	272
Total	734

Diagnosis:

Pulmonary tuberculosis	29
Non-tuberculous	340
Observation	71
Tuberculous pleurisy	1
Intestinal tuberculosis	1
Childhood type tuberculosis	6
Total	448

There were 14 cases of pulmonary tuberculosis re-examined at the sanatorium.

This year 462 patients reported for 511 examinations and 272 ex-patients reported for 335 examinations, making a total of 846 examinations at the sanatorium.

Number of patients examined once, 420; twice, 37; three times, 4; five times, 1.

Number of ex-patients examined once, 218; twice, 47; three times, 5; four times, 2.

Number of physicians referring patients to the sanatorium 140.

The total of all examinations made during the year exclusive of routine work was 1,804, 145 more than last year.

Dental Report

The following is a summary of the dental work done during the year:

Abscess treatments	12	New patients	198
Plate adjustments	14	Osteomyelitis cases	4
Ankylosis	2	Post extractions	430
Bed visits	12	Prophylaxis	101
Emergency cases	6	Pyorrhea	24
Examinations	219	Removal of bony process	1
Exostosis	4	Bridge removals	2
Extractions	411	Repairs to plates	6
Fillings	478	Restorations	20
Gingivitis treatments	171	Stomatitis cases	6
Hemorrhages checked	4	Treatments	847
Hypertrophied gum cases	3	Visitors	2,648
Irrigations	20	Vincents	1
Lancing of gums	12	Vulcanite stomatitis	4
Mouth washes	139	X-rays	855

Statistical Tables

Table 1.—*Admissions and Discharges*

	Males	Females	Total
Patients in sanatorium November 30, 1936	180	181	361
Patients admitted December 1, 1936, to November 30, 1937, inclusive	145	127	272
Patients discharged December 1, 1936, to November 30, 1937, inclusive	138	133	271
Patients remaining in sanatorium November 30, 1937	187	175	362
Daily average number of patients	186.29	181.17	367.46
Deaths (included in number discharged)	29	19	48

Table 2.—*Classification on Admission*

	Classification on Application Blanks		Our Classification on Admission		Percentage	
	1936	1937	1936	1937	1936	1937
Minimal	45	58	21	31	7.04	11.39
Moderately advanced	169	138	113	85	37.92	31.25
Far advanced	60	49	155	143	52.01	52.57
Unclassified	22	27	4	3	1.34	1.10
Childhood type	2	–	2	1	.67	.37
Tuberculous empyema	–	–	1	–	.34	–
Bronchiectasis	–	–	1	1	.34	.37
Bronchiectasis and pulmonary Tuberculosis	–	–	1	–	.34	–
Pleurisy (unknown origin)	–	–	–	3	–	1.10
Lung abscess	–	–	–	2	–	.74
Lung abscess and polyp of bronchus	–	–	–	1	–	.37
Empyema and lung abscess	–	–	–	1	–	.37
Spontaneous pneumothorax	–	–	–	1	–	.37
	298	272	298	272		

Table 3.—*Civil Condition of Patients Admitted*

	Males	Females	Total
Single	67	69	136
Married	71	49	120
Widowed	6	8	14
Divorced	1	1	2
	145	127	272

TABLE 4.—*Age of Patients Admitted*

	Males	Females	Total	Percentage
Under 20 years	7	16	23	8.46
20 to 29 years	51	63	114	41.91
30 to 39 years	47	29	76	27.94
40 to 49 years	18	10	28	10.29
50 to 59 years	17	7	24	8.82
60 to 69 years	4	1	5	1.84
70 years and over	1	1	2	.74
Average age	34.74	29.80	32.43	–
Total	145	127	272	

TABLE 5.—*Nativity and Parentage of Patients Admitted*

Places of Nativity	Males			Females			Totals		
	Patients	Fathers	Mothers	Patients	Fathers	Mothers	Patients	Fathers	Mothers
United States:									
Massachusetts	83	17	19	76	26	28	159	43	47
Other New England States	14	17	14	12	9	13	26	26	27
Other States	12	17	12	12	10	5	24	27	17
Total Native	109	51	45	100	45	46	209	96	91
Other Countries (21)									
Total Foreign	36	94	98	26	78	79	62	172	177
Unknown	0	0	2	1	4	2	1	4	4
Grand Totals	145	145	145	127	127	127	272	272	272

TABLE 6.—*Residences of Patients Admitted*

Place	No.	Place	No.	Place	No.	Place	No.
Agawam	1	Fall River	6	Montcrey	1	Sunderland	1
Arlington	2	Fitchburg	3	New Bedford	4	Taunton	1
Athol	1	Granby	1	Newton	7	Tyngsborough	1
Attleboro	1	Great Barrington	1	North Adams	4	Waltham	1
Belchertown	1	Greenfield	1	Northampton	1	Ware	1
Blackstone	1	Holden	1	North Brookfield	1	Watertown	1
Boston	64	Holyoke	18	Norwood	1	Wayland	1
Brookline	2	Hudson	1	Orange	1	Westfield	8
Cambridge	10	Lexington	1	Palmer	2	West Springfield	3
Carver	1	Longmeadow	1	Pittsfield	6	Weymouth	1
Chelmsford	1	Lowell	12	Revere	6	Willimansett	1
Chelsea	10	Ludlow	3	Rutland	3	Windsor	1
Chicopee	10	Lynn	3	Salem	1	Winthrop	9
Deerfield	1	Malden	1	Shelburne	1	Worcester	5
Dracut	1	Marlborough	1	Somerset	1	Wrentham	1
Duxbury	1	Medfield	1	Somerville	13		
Easton	1	Medford	1	Southbridge	1	Total	272
Everett	6	Millbury	1	South Hadley	1		
		Montague	1	Springfield	8		

TABLE 7.—*Stage of Disease on Admission*

	Males	Females	Total	Percentage
Minimal	14	17	31	11.39
Moderately advanced	34	51	85	31.25
Far advanced	91	52	143	52.57
Unclassified	1	2	3	1.10
Childhood type	–	1	1	.37
Spontaneous pneumothorax	1	–	1	.37
Bronchiectasis	1	–	1	.37
Empyema and lung abscess	1	–	1	.37
Lung abscess	1	1	2	.74
Lung abscess and polyp of bronchus	–	1	1	.37
Pleurisy	1	2	3	1.10
	145	127	272	

TABLE 8.—*Condition on Discharge*

	Males	Females	Total	Percentage
Arrested	2	3	5	1.84
Apparently arrested	4	8	12	4.43
Quiescent	66	67	133	49.08
Improved	13	17	30	11.07
Unimproved	16	14	30	11.07
Dead	29	19	48	17.71
Not considered	8	4	12	4.43
Healed lung abscess	0	1	1	.37
	138	133	271	

TABLE 9.—*Deaths*

Duration of Disease	Males	Females	Totals	Length of Residence at Sanatorium		
				Males	Females	Totals
Under 1 month	0	0	0	4	2	6
1 to 2 months	2	0	2	4	2	6
2 to 3 months	0	0	0	5	1	6
3 to 4 months	0	0	0	2	0	2
4 to 5 months	2	0	2	2	0	2
5 to 6 months	0	0	0	1	0	1
6 to 7 months	1	1	2	0	2	2
7 to 8 months	3	0	3	0	1	1
8 to 9 months	0	0	0	1	1	2
9 to 10 months	1	0	1	0	0	0
10 to 12 months	0	1	1	1	0	1
12 to 18 months	8	3	11	3	4	7
18 to 24 months	0	3	3	2	1	3
Over 2 years	12	11	23	4	5	9
	29	19	48	29	19	48

TABLE 10.—*Causes of Death*

	Males	Females	Total
Pulmonary tuberculosis	27	13	40
Lung abscess	1	0	1
Pulmonary tuberculosis and intestinal tuberculosis	0	1	1
Pulmonary tuberculosis and tuberculosis of epiglottis	1	0	1
Pulmonary tuberculosis and tuberculosis of larynx	0	1	1
Tuberculous meningitis	0	1	1
Tuberculous meningitis and pulmonary tuberculosis	0	1	1
Pulmonary tuberculosis and tuberculous empyema	0	1	1
Pulmonary tuberculosis and tuberculous enteritis	0	1	1
	29	19	48

Financial Report, Rutland State Sanatorium, 1937

To the Department of Public Health:

I respectfully submit the following report of the finances of this institution for the fiscal year ending November 30, 1937.

STATEMENT OF EARNINGS

Board of patients:			
Private	$28,293 00		
Cities and towns	85,800 86		
Chelsea, Revere and Winthrop	33,348 77		
		$147,442 63	
Personal services:			
Labor of Employees			
Reimbursement from Board of Retirement		$116 52	
Sales:			
Food	$364 36		
Furniture and household supplies	6 80		
Medical and general care	369 27		
Farm	435 48		
Garage, stable and grounds	78 68		
Repairs, ordinary	6 53		
Total sales		$1,261 12	
Miscellaneous:			
Rents	$71 53		
Board and room	81 00		
Soil conservation	245 44		
Total, miscellaneous		$397 97	
Total earnings for the year			$149,218 24
Total cash receipts reverting and transferred to the State Treasurer			$160,421 06
Accounts receivable outstanding Dec. 1, 1936,		*$62,219 29	
Accounts receivable outstanding Nov. 30, 1937		$51,016 47	
Accounts receivable decreased			$11,202 82
Accounts receivable Nov. 30, 1936	$63,743 07		
Minus amounts rebated	1,523 78		
	$62,219 29*		

Maintenance Appropriation

Balance from previous year, brought forward		$1,380 84
Appropriation, current year	$373,500 00	
Additional for personal services	4,500 00	
		378,000 00
Total		$379,380 84
Expenditures as follows:		
Personal services	$207,031 88	
Food	59,534 37	
Medical and general care	23,188 49	
Religious instruction	1,861 67	
Farm	14,336 18	
Heat and other plant operation	30,124 56	
Travel, transportation and office expenses	3,332 09	
Garage and grounds	2,980 41	
Clothing and materials	189 12	
Furnishings and household supplies	10,163 55	
Repairs, ordinary	4,283 26	
Repairs and renewals	6,212 29	
Total maintenance expenditures		$363,237 87
Balance of maintenance appropriation, Nov. 30, 1937		16,142 97
Estimated outstanding liabilities, Nov. 30, 1937		$540 60

Special Appropriations

Balance December 1, 1936, brought forward		–
Appropriations for current year		$1,530 00
Total		$1,530 00
Expended during the year (see statement below)	$1,001 18	
Reverting to Treasury of Commonwealth	*528 82	
(Star balances below that are reverting)		1,530 00

Appropriation	Act or Resolve	Total Amount Appropriated	Expended during Fiscal Year	Total Expended to Date	Balance at End of Year
Installation of Hydrants and Improvement Water Supply Mains	Item 601 Acts 1936 and Item 634 Acts 1937	$1,530 00	$1,001 18	$1,001 18	$528 82*

Per Capita

During the year the average number of patients has been		367 46
Total cost of maintenance	$363,237 87	
Equal to a weekly per capita cost of (52 weeks to year)	19 01	
Total receipts for the year	160,421 06	
Equal to a weekly per capita of	8 40	
Total net cost of maintenance for year (total maintenance less total receipts)		$202,816 81
Net weekly per capita	10 61	

Respectfully submitted,

Mary A. Boyle,
Treasurer.

Inventory: Rutland State Sanatorium

GRAND SUMMARY SHEET

November 30, 1937

Real Estate

Land, 364.727 acres	$27,182 94	
Buildings	639,167 65	
Betterments (additions and improvements)	174,357 69	
Total, Real Estate		$840,708 28

Personal Property Undistributed Supplies

(Total of Departmental Sheets)

Travel, transportation and office expenses	$692 10	
Food	4,589 52	
Clothing and materials	387 79	
Furnishings and household supplies	1,671 06	
Medical and general care	4,098 79	
Heat, light and power	1,180 24	
Farm	7,550 85	
Garage, stable and grounds	68 97	
Repairs	5,853 59	
		$26,092 91

Personal Property Distributed Supplies

(Total of Departmental Sheets)

Travel, transportation and office expenses	$2,313 79	
Clothing and materials	503 17	
Furnishings and household supplies	46,425 72	
Medical and general care	18,019 59	
Heat, light and power		
Farm	38,510 77	
Garage, stable and grounds	1,779 14	
Repairs	1,527 45	
Total		$109,079 63

Grand Summary

Real Estate—Total	$840,708 28	
Personal Property—Undistributed Supplies, Total	26,092 91	
Personal Property—Distributed Supplies, Total	109,079 63	
		$975,880 82

WESTFIELD STATE SANATORIUM

Resident Officers

Roy Morgan, M.D., *Superintendent*
Eliot H. Luther, M.D., *Assistant Superintendent*
Frederick J. E. Smith, M.D., *Assistant Superintendent (Cancer)*
James Lewis, M.D., *Senior Physician*
John C. Tate, M.D., *Senior Physician*
H. Victor Ascolillo, M.D., *Senior Physician*
Robert Fienberg, M.D., *Pathologist*
Stanley Frehling, M.D., *Assistant Physician*
Paul T. Hayes, M.D., *Assistant Physician*
Freeman H. Hibben, M.D., *Assistant Physician*
William T. Ruark, M.D., *Assistant Physician*
George E. Crowell, D.M.D., *Dentist*
Bessie MacDonald, R.N., *Superintendent of Nurses and Matron*
Josephine E. French, *Treasurer*
John E. Kinsella, *Steward*
William M. Wade, *Chief Engineer*
William G. Atkinson, *Head Farmer*

Non-Resident Officers

Ernest M. Daland, M.D., *Medical Director (Cancer)*
Eugene W. Beauchamp, M.D., *Surgeon*
Frank H. Baehr, M.D., *Surgeon*
Frederick E. Hopkins, M.D., *Surgeon*
Archibald J. Douglas, M.D., *Surgeon*
Alfonso A. Palermo, M.D., *Assistant Surgeon*
Matthew J. Bachulus, M.D., *Assistant Surgeon*
John V. Greany, M.D., *Assistant Surgeon*
Landislaw E. Pfeifer, M.D., *Assistant Surgeon*
W. Fenn Hoyt, M.D., *Thoracic Surgeon*
Winford O. Wilder, M.D., *Urologist*
James A. Seaman, M.D., *Urologist*
Richard A. Rochford, M.D., *Gynecologist*
John E. Dwyer, M.D., *Internist*

James Quinn, M.D., *Internist*
Patrick M. Moriarty, M.D., *Internist*
Allen S. Johnson, M.D., *Internist*
*Marshall M. Menzies, M.D., *Consultant in Diseases of Eyes, Ears, Nose and Throat*
*John Pallo, M.D., *Consultant in Diseases of Eyes, Ears, Nose and Throat*
Adolphus D. Rood, M.D., *Consultant in Bronchoscopy*
Sylvester E. Ryan, M.D., *Proctologist, Consultant*
Charles L. Fuccolo, M.D., *Neuro-Surgeon, Consultant*
Adolph Franz, Sr., M.D., *Internist, Consultant*
George D. Henderson, M.D., *Internist, Consultant*
Harry F. Byrnes, M.D., *Laryngologist, Consultant*
Harold F. Owens, M.D., *Ophthalmologist, Consultant*
Joe V. Meigs, M.D., *Gynecologist, Consultant*
Roger C. Graves, M.D., *Urologist, Consultant*
Shields Warren, M.D., *Pathologist, Consultant*
John S. Hodgson, M.D., *Neuro-Surgeon, Consultant*

* Six months each.

Report of the Superintendent

To Dr. Henry D. Chadwick, *Commissioner, Department of Public Health:*

I have the honor to submit the twenty-eighth annual report of the Westfield State Sanatorium for the year ending November 30, 1937.

Financial Statement

During the year there has been expended $284,198.07 for maintenance, a gross weekly per capita cost of $31,961. There has been expended from Special Appropriations—Improving Water Supply, $4,674.74; Additional Fire Protection, $906.00; Enlarge Sewage Disposal System, $5,514.32 and from P. W. A. Docket No. 1155-Mass. Project-H 102—Cancer and Tuberculosis Hospital, $380,701.31.

There has been collected from miscellaneous sources (the total of all collections), $57,835.94. Deducting this amount from the gross maintenance expense leaves a net expense of $226,362.13, a net weekly per capita cost of $6,504. There has been collected from private sources $2,153.00 and from cities and towns $52,443.50.

Of the 79 patients admitted during the year, 3 cases were supported wholly or in part from private funds; 48 cases by cities and towns; 9 wholly by the State, and 2 by the Department of Public Welfare, Division of Child Guardianship. There were 17 cases on which settlements have not been determined.

Population

There were 186 patients in the sanatorium at the beginning of the year and 125 at the close. The largest number of patients at any one time was 197 and the smallest number was 117. The daily average number of patients was 171. There were 79 patients admitted during the year and 140 were discharged, including deaths. Fifty-four cases were admitted from cities and towns of over 25,000 population and 25 from cities and towns of less than 25,000. The average age of patients was 13.4 years. The average length of stay of patients discharged, including deaths, was 533.8 days. Of the 140 discharged cases, 8 were apparently well, 85 apparently arrested, 21 improved, 16 unimproved and 10 deaths. Of the discharged patients, 125 gained 2,240 pounds. Hospital days of patients was 62,413. The average number of employees and officers during the year was 167.

Medical Report

There has been no change in our medical treatment. Artificial pneumothorax has been used in 60 cases, 1,931 injections being given. Thirty-nine out-patients have been treated, 518 injections having been given to these.

Thirty-five Adult-Type cases were discharged during the year. Pneumothorax treatment was tried in 19 of these, 14 with success, and 5 unsuccessful. Pneumolysis was used in 3 cases; phrenic crushing in 3; open pneumothorax in 1; and thoracoplasty in 1.

During the year we had 12 cases of scarlet fever and 1 of mumps, otherwise we were free of contagious diseases.

The following table records the results of our Out-Patient Clinic and of our Consultation Clinics in Great Barrington, Greenfield and North Adams:

	Negative		Suspicious		Positive		Total
	New	Re-exam	New	Re-exam	New	Re-exam	
Consultation . .	347	207	35	15	26	108	738
Out-Patient . .	1,663	502	244	145	151	307	3,012

As usual we have furnished medical service to the Hampden County Tuberculosis Association. This included routine medical service at their Summer Camp. All the camp children were tested and x-rayed. Physical examinations were made whenever indicated. We also helped the Association in 2 Special Adult Clinics.

School Clinics were continued in the 4 western counties up to June. In September this work was taken over by Dr. Zack's Clinic group. During the year ending in June we covered 28 cities and towns with a school enrollment of 22,999 in the grades tested. 12,627 children or 55% were tested. 1,861 or 15% reacted. 2,763 films were taken and 362 physical examinations were made. Five Adult Type cases were found, and 26 of the Childhood Type.

We have also conducted x-ray surveys at the Massachusetts State College, Amherst, and Smith College.

Institution Activities

The regular meeting of Western Massachusetts Health Officials was held here on June 9th with an attendance of 150. On October 18th the Council of Social Agencies of Springfield held their Fall meeting here.

Personnel Changes

We suffered a great loss this year through the death of Dr. Heman B. Chase, Assistant Superintendent, on October 11, 1937. Dr. Chase had been with us for seventeen years. During that time he had rendered loyal and efficient service. His passing is deeply regretted by a host of friends, both in and out of the Institution; and it will take a long time to adjust ourselves to his loss. The vacancy was filled by the promotion of Dr. Eliot Luther from the rank of Senior Physician. In November, however, it became necessary to grant Dr. Luther a year's leave of absence for reasons of health. Dr. James Lewis, Senior Physician, has been appointed Acting Assistant Superintendent. Dr. William T. Ruark was appointed Assistant Physician March 15th. Dr. Frederick J. C. Smith came to us on September 1st to serve as Assistant Superintendent in charge of the new cancer wards. Dr. Robert Feinberg came on November 1st as Pathologist and Dr. Stanley Frehling as Assistant Physician. Dr. Paul T. Hayes came on November 8th as Assistant Physician. There were no other important changes in Personnel.

Improvements and Changes

The work on the new buildings has been virtually completed. Early in November the new Nurses' Home was occupied. On November 17th the offices and Out-Patient Tuberculosis Clinic were moved to the New Hospital. On November 29th two wards were opened for the care of tuberculosis. At the end of the fiscal year 7 patients had been admitted to these wards. It is expected that the Cancer Wards will be ready to receive patients on December 6th. On November 1st we closed the old North and South wards. Sometime in December it is planned to close the old East Ward, transferring the patients to the New Hospital. The closing of these wards was made necessary by the fact that our admissions of children have dropped to a very low point.

A section of the laundry floor was relaid and a new washer installed. A hot water heater has been ordered but not yet delivered. A new milk room has been built with a new pasteurizer and cooling unit.

Recommendations

Our flat work ironer is in very poor condition and also is too small. A new and larger one should be installed next year. Also, another laundry press is needed.

We have included in our budget, under Repairs and Renewals, a number of items needed by our engineering department. These are mainly needed to fill in the gaps which have been left when the Power Plant was remodeled. We have also submitted a few Specials as drawn up by the Sanitary Engineers.

Acknowledgments

I wish to commend the loyalty and efficiency of my Personnel here and also the cooperation of other members of the Department. Without this it would have been almost impossible to carry on during the past year.

Surgical Report

The following is a list of operations done at the Institution:

Phrenic crushing	5
Open pneumothorax	1
Pneumolysis	9
Open Pneumolysis	1
Thoracoscopy	4
Tonsillectomies	6
Total	26
Artificial pneumothorax treatments	2,449

There were 11 thoracoplasties done at the Springfield Hospital.

Laboratory Report

Blood	
Clinical Pathology:	
Red blood counts	390
White blood counts	820
Hemoglobin	395
Differential white counts	750
Bleeding and clotting time	20
Sputum	
Smears	1,482
Guinea pig inoculations	3
Pleural Fluids	
Cell counts	4
Cultures	9
Smears	9
Spinal Fluids	
Cell counts	4
Chemical	4
Cultures	4
Smears	4
Urine	
Routine chemical and microscopic	1,205
Feces	
Occult blood	20
Ova and parasites	15
Stomach Contents	
Guinea pig inoculations	60

Dental Report

Prophylactic treatments	189
Fillings—permanent teeth	1,192
Fillings—temporary teeth	96

Extractions—permanent teeth	167
Extractions—temporary teeth	93
Treatments	30
Restorations	3
X-rays	10
Irrigations	4
Dental examinations	200
Total operations	1,984
Total visits	1,293

School Report

Average daily attendance from December, 1936, to December, 1937:

Grade I	13.06	Grade VI	9.19
Grade II	8.15	Grade VII	9.47
Grade III	3.98	Grade VIII	4.38
Grade IV	4.97	High school grades	7.42
Grade V	6.37	Manual training	4.2
Total average attendance			71.19
Total enrollment			.124

Respectfully submitted,

Roy Morgan, M.D.,
Superintendent

Statistical Tables

Table 1.—*Admissions and Discharges*

	Males	Females	Totals
Patients in Sanatorium November 30, 1936	89	97	186
Patients admitted December 1, 1936 to November 30, 1937, inclusive	40	39	79
Patients discharged December 1, 1936 to November 30, 1937, inclusive	78	62	140
Deaths (included in number discharged)	6	4	10
Patients remaining in Sanatorium November 30, 1937	51	74	125
Daily average number of patients	82	89	171

Table 2.—*Classification on Admission*

	Classification on Application Blanks		Our Classification on Admission		Per Cent	
	1936	1937	1936	1937	1936	1937
Acute appendicitis (post operative)	–	–	–	1	–	–
Advanced	8	9	6	12	5.6	15.2
Asthma	–	–	3	–	2.8	–
Bronchiectasis	–	–	1	–	.9	–
Cervical adenitis (tuberculous)	1	–	2	–	1.8	–
Childhood tuberculosis	40	27	45	30	41.7	38.0
Childhood type (infiltrative)	1	4	1	6	.9	7.6
Malnutrition	–	–	6	–	5.6	–
Mastoiditis	–	–	–	1	–	–
Military tuberculosis	–	–	3	–	2.8	1.3
Minimal	19	14	10	11	9.3	14.3
Moderately advanced	15	13	21	10	19.5	13.2
No disease	–	1	2	1	1.8	1.3
Pleurisy with effusion	5	1	5	2	4.6	2.6
Pott's disease	–	–	1	1	.9	1.3
Rheumatic arthritis	–	–	1	–	.9	–
Suspicious	1	–	–	–	–	–
Tuberculous glands of neck	1	–	–	1	–	1.3
Tuberculous hip	–	–	1	2	.9	2.6
Tuberculous mesenteric glands	–	–	–	1	–	–
Unclassified	17	10	–	–	–	1.3
	108	79	108	79	100.00	100.00

Table 3.—*Civil Condition of Patients Admitted*

	Males	Females	Totals
Single	32	33	65
Married	6	6	12
Widowed	2	–	2
	40	39	79

TABLE 4.—*Ages of Patients Admitted*

	Males	Females	Totals	Percentages
Under 5 years	12	6	18	22.8
5 to 9 years	9	7	16	20.3
10 to 14 years	7	4	11	13.9
15 to 19 years	10	13	23	29.1
20 to 29 years	1	2	3	3.8
30 to 39 years	0	5	5	6.3
40 to 49 years	0	0	0	0.0
50 to 59 years	1	2	3	3.8
	40	39	79	100.0

Average age 13.7 years.

TABLE 5.—*Nativity and Parentage of Patients Admitted*

Places of Nativity	Males			Females			Totals		
	Patients	Fathers	Mothers	Patients	Fathers	Mothers	Patients	Fathers	Mothers
United States:									
Massachusetts	33	11	16	33	13	11	66	24	27
Other New England States	6	5	11	2	1	4	8	6	15
Other States	–	3	–	1	1	2	1	4	2
Total Native	39	19	27	36	15	17	75	34	44
Foreign Countries:									
Australia	0	0	0	0	1	1	0	1	1
Azores	0	0	1	0	0	0	0	0	1
Canada	0	5	1	0	5	6	0	10	7
Czechoslovakia	0	0	0	0	1	1	0	1	1
England	0	1	0	0	0	0	0	1	0
Greece	0	0	0	0	1	1	0	1	1
Ireland	0	0	0	0	3	3	0	3	3
Italy	0	1	1	0	1	1	0	2	2
Poland	1	10	10	2	8	8	3	18	18
Portugal	0	0	0	1	1	1	1	1	1
Russia	0	0	0	0	2	0	0	2	0
Spain	0	2	0	0	0	0	0	2	0
Sweden	0	0	0	0	1	0	0	1	0
Total, Foreign	1	19	13	3	24	22	4	43	35
Unknown	0	2	0	0	0	0	0	2	0
Total	1	21	13	3	24	22	4	45	35
Total Native	39	19	27	36	15	17	75	34	44
Grand Total	40	40	40	39	39	39	79	79	79

TABLE 6.—*Residence of Patients Admitted*

Place	No.	Place	No.	Place	No.	Place	No.
Athol	1	Hatfield	1	Northampton	1	Westfield	5
Boston	3	Holden	1	Orange	1	West Springfield	4
Chicopee	7	Holyoke	7	Pittsfield	5	Wilbraham	1
Dudley	1	Leominster	1	Southbridge	1	Worcester	1
Fitchburg	10	Ludlow	4	Springfield	20		
Greenfield	2	New Bedford	1	Webster	1	Total	79

TABLE 7.—*Stage of Disease on Admission*

	Males	Females	Totals	Percentages
Acute appendicitis (post-operative)	1	0	1	1.3
Advanced	2	10	12	15.1
Childhood tuberculosis	16	14	30	38.0
Childhood type (infiltrative)	3	3	6	7.6
Empyema pneumococcus	0	1	1	1.3
Mastoiditis	1	0	1	1.3
Minimal	7	4	11	13.8
Moderately advanced	4	6	10	12.7
No disease	0	1	1	1.2
Pleurisy with effusion	1	0	1	1.3
Pleurisy effusion (tuberculous)	1	0	1	1.3
Pott's disease	1	0	1	1.3
Tuberculous mesenteric glands	1	0	1	1.3
Unclassified	2	0	2	2.5
	40	39	79	100.00

TABLE 8.—*Condition on Discharge*

	Males	Females	Totals	Percentages
Apparently arrested	49	36	85	60.8
Apparently well	3	5	8	5.7
Died	6	4	10	7.1
Improved	11	10	21	15.0
Unimproved	9	7	16	11.4
	78	62	140	100.00

TABLE 9.—*Deaths, by Length of Residence, at Sanatorium*

Duration of Disease	Males	Females	Totals	Length of Residence at Sanatorium		
				Males	Females	Totals
Under 1 year	2	2	4	2	3	5
1 to 2 years	0	2	2	1	1	2
Over 2 years	4	0	4	3	0	3
	6	4	10	6	4	10

TABLE 10.—*Causes of Death*

	Males	Females	Totals
Pulmonary tuberculosis	5	3	8
Childhood tuberculosis (infiltrative)	1	1	2
Total	6	4	10

Financial Report, Westfield State Sanatorium, 1937

To the Department of Public Health:

I respectfully submit the following report of the finances of this institution for the fiscal year ending November 30, 1937:

STATEMENT OF EARNINGS

Board of patients:			
Private	$2,123 00		
Cities and towns	46,591 00		
		$48,714 00	
Personal services:			
Reimbursement from Board of Retirement		$90 45	
Sales:			
Food	698 87		
Clothing and materials	620 78		
Furniture and household supplies	13 00		
Medical and general care	120 57		
Heat, light and power	96 05		
Farm	1,389 54		
Arts and crafts sales	66 15		
Total sales		$3,004 96	
Miscellaneous:			
Rents	$116 45		
Miscellaneous income	27 58		
Total, miscellaneous		$144 03	
Total earnings for the year			$51,953 44
Total cash receipts reverting and transferred to the state treasurer			$57,835 94
Accounts receivable outstanding Dec. 1, 1936		$16,617 50	
Accounts receivable outstanding Nov. 30, 1937	$10,735 00		
Accounts receivable decreased			$5,882 50

MAINTENANCE APPROPRIATION

Balance from previous year, brought forward		$3,535 22
Appropriation, current year	$292,490 00	
Supplementary budget	4,600 00	
		297,090 00
Total		$300,625 22
Expenditures as follows:		
Personal services	$174,350 34	
Food	30,171 09	
Medical and general care	10,275 91	
Farm	9,977 96	
Heat, light and power	28,293 45	
Garage, stable and grounds	3,182 87	
Travel, transportation and office expenses	4,134 47	
Religious instruction	1,070 00	

Clothing and materials	1,527 75	
Furnishings and household supplies	6,361 04	
Repairs ordinary	4,879 25	
Repairs and renewals	9,749 95	
Total maintenance expenditures		$283,974 08
Balance of maintenance appropriation, Nov. 30, 1937		$16,651 14
Estimated outstanding liabilities, Nov. 30, 1937		$13,287 62

Special Appropriations

Balance December 1, 1937, brought forward		$458,033 65
Appropriations for current year		251,450 00
Total		$709,483 65
Expended during the year (see statement below)	$465,819 76	
Reverting to Treasury of Commonwealth (Star balances below that are reverting)	*	
Balance November 30, 1937, carried to next year		$243,663 89

Appropriation	Act or Resolve	Total Amount Appropriated	Expended during Fiscal Year	Total Expended to Date	Balance at end of Year
E. P. W. Construction P.W.A. Docket 1155 Mass. Proj. H. 102 Cancer and TB Group	1935 1936 and 1937	$1,000,000	$380,715 31	$881,276 82	$118,723 18
Fire Protection and Sprinklers Chap. 304, Item 604	1936	3,394	906 00	2,297 47	1,096 53
Improvement to Water Supply System, Chap. 304–Item 603	1936 and 1937	29,600	4,674 74	9,167 02	19,982 98
Enlarged Sewage Disposal System Chap. 304, Item 603	1936 and 1937	8,850	5,514 32	7,879 41	970 59
Remodeling Space for Staff Quarters, Furnishing and Equipment, Acts 1937—Item 637-A	1937	4,600	442 60	442 60	4,157 40
Furnishings and Equipment for New Building	1937	135,000	67,273 60	67,273 60	67,726 40
Cancer and Adult Tuberculosis Service	1937	37,300	6,293 19	6,293 19	31,006 81
		$1,218,744 00	$465,819 76	$975,080 11	$243,663 89

Per Capita

During the year the average number of patients has been		171
Total cost of maintenance	$283,974 08	
Equal to a weekly per capita cost of (52 weeks to year)	31 935	
Total receipts for the year	$57,835 94	
Equal to a weekly per capita of	6 504	
Total net cost of maintenance for year (total maintenance less total receipts)		$226,138 14
Net weekly per capita	25 431	

Respectfully submitted,

(signed) Josephine E. French,
Treasurer.

Inventory: Westfield State Sanatorium

GRAND SUMMARY SHEET

November 30, 1937

Real Estate

Land, 266.7 acres	$11,021 00	
Buildings	899,566 00	
Betterments (additions and improvements)	448,340 77	
Total, Real Estate		$1,358,927 77

Personal Property Undistributed Supplies

(Total of Departmental Sheets)

Travel, transportation and office expenses	200 00	
Food	4,212 25	
Clothing and materials	2,905 67	
Furnishings and household supplies	2,653 91	
Medical and general care	1,313 00	
Heat, light and power	1,933 56	
Farm	2,064 34	
Garage, stable and grounds	36 06	
Repairs	13 62	
		$15,332 41

Personal Property Distributed Supplies

(Total of Departmental Sheets)

Travel, transportation and office expenses	$4,136 32	
Clothing and materials	769 58	
Furnishings and household supplies	40,070 65	
Medical and general care	44,323 09	
Heat, light and power	3,658 24	
Farm	34,565 72	
Garage, stable and grounds	7,588 19	
Repairs	2,555 79	
Total		$137,667 58

Grand Summary

Real Estate—Total	$1,358,927 77	
Personal Property—Undistributed Supplies, Total	15,332 41	
Personal Property—Distributed Supplies, Total	137,667 58	
		$1,511,927 76

PONDVILLE HOSPITAL

Resident Officers

George L. Parker, M.D., *Superintendent.*
Norman H. Bruce, M.D., *Assistant Superintendent.*
Adolph Meltzer, M.D., *Assistant Physician.*
Donald S. Adams, M.D., *Assistant Physician.*
Henry L. Jaffe, M.D., *Assistant Physician.*
Carl M. Binning, M.D., *Assistant Physician.*
Orrin Levin, M.D., *Assistant Physician.*
Alvin O. Severance, M.D., *Pathologist.*
Geoffrey P. Keane, M.D., *Pathologist.*
Dorothy Z. Silver, R.N., *Principal of School of Nursing.*
Marion Whelan, *Treasurer.*
Lucille Horton, *Dietitian.*
Florence Mullen, *Head Housekeeper.*
Neil Fountain, *Head Social Service Worker.*
Ernest L. Gage, *Chief Power Plant Engineer.*
John Lang, *Carpenter.*
Niel Nelson, *Groundskeeper.*
Roger Mitchell, *Head of Garage.*

Non-Resident Officers

Ernest M. Daland, M.D., *Surgeon and Chief.*
Grantley W. Taylor, M.D., *Surgeon.*
Horatio Rogers, M.D., *Surgeon.*
Richard H. Wallace, M.D., *Assistant Surgeon.*
Thomas Anglem, M.D., *Assistant Surgeon, OPD.*
Joe Vincent Meigs, M.D., *Gynecologist.*
Langdon Parsons, M.D., *Assistant Gynecologist.*
Roger C. Graves, M.D., *Urologist.*
Charles J. E. Kickham, M.D., *Assistant Urologist.*
John S. Hodgson, M.D., *Neurological Surgeon.*
Richard H. Norton, D.M.D., *Oral Surgeon.*
Carl Ernlund, M.D., *Laryngologist.*
Henry Jackson, Jr., M.D., *Physician.*
Dudley Merrill, M.D., *Assistant Physician.*
Maxwell Finland, M.D., *Assistant Physician.*
Arthur W. Greenwood, M.D., *Dermatologist.*
Hugo B. C. Riemer, M.D., *Opthalmologist.*
Charles A. Dumas, M.D., *Roentgenologist.*
William J. Elliott, M.D., *Assistant Roentgenologist.*
Harry W. Harding, D.M.D., *Dentist.*
James C. Hudson, Ph.D., *Physicist.*
Shields Warren, M.D., *Pathologist.*
Olive Gates, M.D., *Assistant Pathologist.*
Sidney C. Wiggin, M.D., *Anesthetist.*
F. H. L. Taylor, Ph.D., *Physiological Chemist.*

Report of the Superintendent

To Henry D. Chadwick, M.D., *Commissioner, Department of Public Health:*

I have the honor to submit the eleventh annual report of the Pondville Hospital (Norfolk), P. O. Wrentham, Massachusetts, for the year ending November 30, 1937.

Financial Statement

During the year, there has been expended for maintenance $343,220.58, a gross weekly per capita cost of $50.15. There has been collected from miscellaneous sources $83,208.77 (the total of all collections). Deducting this amount from the gross maintenance leaves a net expense of $260,011.81. The net weekly per capita cost was $38.00. There has been collected from private patients $26,254.54, from cities and towns $54,463.00, from the out-patient department $1,116.00, from accident cases $18.00, and from miscellaneous sales and other sources $966.49, and reimbursement from the State Board of Retirement $78.74.

Six hundred and twenty-seven patients were supported by private funds, 565 by cities and towns, and 38 by the state, leaving 78 settlements pending.

There has been expended from Special Appropriations allotted under the Acts of 1934, Massachusetts State Project H–6, P.W.A. Docket 4200, for addition to present hospital building including furnishings and equipment, $762.53, for Massachusetts State Project H–5, P.W.A. Docket 4476 new Service Building including furnishings and equipment $1,751.82, from the Special Appropriation allotted under the Acts of 1935 and 1936 Service Building Renovation, etc., $370.25, from the Special Appropriation under the Acts of 1936 Improvements to Water Supply System $25.80, from the Special Appropriation under the Acts of 1936 and 1937 for Improvements Sewage Disposal $3,177.73, from the Special Appropriation under the Acts of 1937 for Roads and Parking Space $7,422.40.

Population

There were 134 patients in the hospital on November 30, 1936. During the year, there were 1,431 admissions. Of these, 442 represented readmissions. Patients were received from 182 cities and towns. Patients were also received from 16 other state institutions. One hundred and twenty-eight patients remained in the hospital at the end of the year.

Discharges during the year numbered 1,437. The condition of 915 was improved, 270 were unimproved and 252 died. There were 199 autopsies.

The average period of hospitalization was 35.4 days. The smallest number in the hospital on any one day was 106; the largest number, 145. The average number of patients a day was 131.6.

The daily average number of officers and employees was 191.8.

Medical Report

During the year, there has been a considerable increase in the work of all hospital departments, particularly in the surgery. This has necessitated the addition of two nurses and a maid to this department. Although there was a decrease of 2.9% in admissions over the previous year, there was an increase of 11.2% in major operations and an increase of 13.7% in total operations. There was an increase of 27.9% in the number of x-ray treatments. These two factors alone raised the average length of hospitalization to 35.4 days, an increase of 2.1 days over that of 1936. Discharges (including deaths) decreased 0.9%. The number of surgical specimens handled by the pathological department increased 1.7% and the number of autopsies increased 19.9%. The number of deaths increased 1.6% over last year.

Weekly clinics were continued with 50 clinics held. Visits to the regular Thursday clinic numbered 3,401, with an average attendance of 68. Patients making their first visit to the clinic numbered 1,009. Out-patient visits other than the regular Thursday clinic number 1,931. Of these, 64 were new patients. The total clinic visits numbered 5,332, an increase of 6.8%. There were 473 clinic patients who were subsequently admitted to the hospital.

X-ray and Radium:

Diagnostic x-ray plates taken, 5,584; fluoroscopic examinations, 554; x-ray treatments, 6,342; radium treatments, 393.

Surgical Report

Operations: Major, 588; minor, 973; procedures without anesthetics, 880. Total procedures, 2,441. Of these procedures, 575 were biopsies, 14 bronchoscopies, 335 cystoscopies, 23 esophagoscopies, 35 laryngoscopies, 96 proctoscopies, and 215 transfusions.

An anesthetic was given 1,561 times: Avertin, 16; caudal, 6; cocaine, 74; cyclopropane, 1; ether, 4; ethyl chloride, 2; evipal, 61; gas-oxygen, 89; gas-oxygen-ether, 360; novocain, 788; pentothal, 1; spinal, 159.

Laboratory Report

Blood

1. Clinical Pathology

R.B.C. counts	1,727
W.B.C. counts	1,792
Differential counts	1,215
Hemoglobin estimations	1,837
Sedimentation tests	10
Hematocrit	8
Icterus index	53
Coagulation	13
Van den Bergh tests	14
Bleeding time	12
Platelet counts	6
Reticulocyte counts	8
Fragility R.B.C.	4
Takata-Ara tests	7

2. Chemistry

Sugar	113
N.P.N.	1,769
Chlorides	36
Albumen-globulin ratio	61
Calcium	3
Phosphorus	3
Total protein	60

3. Bacteriology and Serology

Culture	27
Grouping	361
Matching	365
Hintons and Wassermanns	1,468
Malarial parasites	1

Sputum

Smears	78
Concentration	6
Cultures	1
Guinea-pig inoculations	4

Pleural Fluids

Cultures	23
Smears	22

Spinal Fluids

Cell counts	5
Chemical	24

Urine

Routine chemical and microscopical	7,257
Special chemical	9
Kidney function test	309
Cultures	236

Feces	
Occult blood	352
Bacteriological—tubercle bacilli	10
Stomach Contents	
Chemical	22
Bacteriological—tubercle bacilli	3
Surgical Specimens	1,406
Autopsies	203*
Microscopic Sections	
Frozen	128
Paraffin	5,525
Colloidin	3,330
Pus Smears	88
Pus Cultures	86
Nose, Throat, Mouth Smears	31
Nose, Throat, Mouth Cultures	38
Basal Metabolism Tests	51
Water Cultures	8
Miscellaneous Examinations	36
Totals	30,264

* Includes 3 from Norfolk County Sanatorium and 1 employee.

Dental Report

Prophylactic treatments, 136; extractions (permanent teeth), 639; treatments, 330; x-ray examinations, 260; examinations, 886. Total, 2,251. Total number of visits, 1,311; total number of new patients, 886.

Institution Activities

The following program of clinics and meetings was held during the year:

April 14—State-wide Cancer Clinic.

May 18—Group from Northern Worcester County Health Workers' Club.

June 21—Celebration and dinner for patients, employees and guests in honor of the hospital's tenth anniversary.

Staff meetings were held monthly for the discussion of cases by the visiting and resident medical and surgical staffs.

Numerous groups of students from Harvard, Boston University, Tufts and Middlesex medical schools attended clinics throughout the year.

A group of students from the Newton Theological Seminary visited the hospital on November 8.

A series of lectures by members of the visiting staff has made the work more interesting for the resident physicians.

Through the courtesy and cooperation of our clergy, numerous musical programs by choirs and local brass bands have been rendered for the patients.

Good fellowship among the employees has been stimulated by the activities of our local baseball team and by tennis matches. Through the courtesy of the superintendent of the Wrentham State School, our employees have continued to enjoy the use of the bowling alleys of that institution weekly.

Personnel Changes

Dr. Richard Dresser resigned as roentgenologist and that position was filled by Dr. Charles E. Dumas. Dr. Thomas Anglem was appointed assistant surgeon in the out-patient department to succeed Dr. Clifford Franseen who resigned. Dr. Alvin O. Severance and Dr. Geoffrey P. Keane were appointed resident pathologists to succeed Dr. Lauren V. Ackerman and Dr. Robert Schrek. Dr. Weston T. Buddington, after a period of excellent service as assistant superintendent, resigned to

go into private practice. The vacancy caused by the promotion of Dr. Norman H. Bruce to the position of assistant superintendent was filled by Dr. Carl M. Binnig. Dr. Theodore Raiford was appointed to succeed Dr. Richard G. Whiting; Dr. Henry L. Jaffe was appointed to succeed Dr. Rutledge S. Lampson; and Dr. Orrin Levin was appointed to succeed Dr. Raiford who resigned. Miss Lucille Horton was appointed as dietitian to succeed Miss Catherine Hayes who resigned to enter the state clinical nutrition work. Miss Margaret Thompson was appointed to the position of assistant dietitian. Mr. Niel Nelson was promoted to the position of groundskeeper to succeed Mr. Jesse Samples who resigned to go into the nursery business. Mr. Roger Mitchell was appointed Head of Garage.

Improvements and Changes

A new parking space and road in front of the hospital buildings has been completed.

The cement retaining wall in the rear of the new service building has been finished.

Two new filter beds and nearly 360 feet of new sewer pipe have been added to our sewage system and the dosage tank was repaired.

The porches on the new hospital wing have been glassed in.

The roof of the administration building has been reshingled.

The water fire storage tank has been cleaned, caulked and painted and the spillway at Spring Pond has been repaired.

The bathroom on the second floor of employees' cottage C has been enlarged and completely renovated and larger hot water tanks have been installed in employees' cottages C and D.

Twelve rooms have been replastered and painted and additional nurses' call-lights installed on ward D.

Ventilation of our new out-patient clinic rooms has been completed.

Equipment such as surgical instruments, mattresses, linen, filing cabinets, laboratory equipment, fire hose, etc., has been replaced where necessary.

A new Picker shock-proof x-ray machine and a urological x-ray table have been added to our x-ray department.

Recommendations

The housing accommodations for employees have not expanded with the enlargement of the hospital and the increase in personnel. This situation becomes more acute each year, and again I earnestly request the construction of a 100-bed nurses' dormitory which would solve our present housing problem.

Two years ago our recreation building was condemned by the Department of Public Safety. This has eliminated the parties and dances formerly enjoyed by employees and the motion pictures enjoyed by both patients and employees. This situation should be remedied immediately. Many of the offices in our administration building and the laboratories in the hospital are too crowded for efficiency. A new administration building with business and executive offices, pathological, bacteriological, biological and animal research laboratories, and a recreation hall would not only present a solution of our problem, but would also give us the old building to use for fifteen additional beds and a much-needed record office space.

Fire protection has not been provided for the "white house" because of insufficient funds. For the safety of the employees who reside in this building, I again respectfully request that an allowance for this fire protection be made.

Our roads have long been in urgent need of repair and funds were insufficient to complete the lighting and curbing of our new parking space. I earnestly request that an allowance be made to complete this work and to do at least a portion of the road work this year.

The roofs of many of our buildings are leaking badly because the asbestos shingles now covering the pitched roofs are cracked and porous. I, therefore, earnestly request that an allowance be made for the reshingling of the roofs covering wards B and D.

Although some of the permanent equipment was replaced this year, the situation still is most unsatisfactory. New lavatory pipes and fixtures are needed in the wards and cottages and I again earnestly request allowance for this equipment.

The heavy demands on our medical and surgical supplies and apparatus increases each year and I respectfully request sufficient funds in addition to the general maintenance for 1938 so that our high standards and efficient service may continue.

The boilers in our power plant have been in operation for over twenty-five years and the equipment becomes more inefficient each year. This situation should be rectified and I strongly urge that an allowance be made to remedy this condition.

Although two new filter beds were added this year, our sewage system is not efficient and three of the older filter beds should be reconstructed. I, therefore, respectfully request that funds be made available to remedy this situation.

There was insufficient appropriation allotted this year for new floors and coverings throughout the hospital buildings and employees' cottages. For ultimate economy in maintenance, I again earnestly request that an appropriation be made to continue their replacement.

Our present garage accommodations are still very inadequate and the many cars owned by employees continue to be scattered throughout the grounds. I again recommend that a larger garage be constructed to rectify the present situation.

Acknowledgments

Again I wish to express my appreciation to the Reverend Father Mitchell and his assistants and to the Reverend Melville Shafer who have ministered to the spiritual needs of our patients throughout the year.

I am deeply grateful to the members of the Social Service Committee and to the Ladies' Society of the Wrentham Congregational Church who have given so freely of their time and resources in maintaining the happiness of our patients.

To the American Legion Band of Norwood and to the numerous groups of choir singers who have rendered musical programs for our patients, I wish to express my appreciation.

The medical staff, nurses and employees have again given me their loyal support and cooperation and have made possible whatever measure of service has been rendered.

Again I wish to thank you and the other members of the Department for your continued confidence and assistance throughout the year.

Respectfully submitted,

George L. Parker, M.D.,
Superintendent.

Statistical Tables

Table 1—*Admissions and Discharges*

	Males	Females	Total
Patients in hospital December 1, 1936	67	67	134
Patients admitted from December 1, 1936, to November 30, 1937, inclusive	659	772	1,431
Patients discharged from December 1, 1936, to November 30, 1937, inclusive	668	769	1,437
Patients remaining in hospital November 30, 1937	58	70	128
Daily average number of patients	65.9	65.7	131.6
Deaths (included in number discharged)	161	91	252

Table 2.—*Readmissions*

	Males	Females	Total
Total patients treated	726	839	1,565
Less old patients readmitted first time since December 1, 1936	66	119	185
Less other readmissions	124	133	257
Less patients in hospital December 1, 1936	67	67	134
Number new patients admitted from December 1, 1936, to November 30, 1937	469	520	989
Total number different patients treated December 1, 1936, to November 30, 1937	602	706	1,308

Table 3.—*Civil Condition of New Patients Admitted*

	Males	Females	Total
Single	79	59	138
Married	266	297	563
Widowed	110	140	250
Divorced	7	13	20
Separated	7	11	18
Totals	469	520	989

TABLE 4.—*Age of New Patients Admitted*

	Males	Females	Total
Under 20 years	2	5	7
20 to 29 years	9	23	32
30 to 39 years	8	59	67
40 to 49 years	47	119	166
50 to 59 years	100	137	237
60 to 69 years	166	107	273
70 to 79 years	107	57	164
80 to 89 years	28	13	41
90 to 99 years	2	0	2
Totals	469	520	989

TABLE 5.—*Nativity of New Patients Admitted*

	Males	Females	Total		Males	Females	Totals
United States	234	315	549	Italy	19	16	35
Armenia	3	2	5	Lithuania	4	3	7
Australia	0	1	1	Norway	1	0	1
Austria	6	0	6	Poland	16	11	27
Canada	65	75	140	Portugal	11	11	22
Denmark	1	0	1	Russia	16	4	20
England	30	25	55	Scotland	5	8	13
Finland	6	0	6	Sweden	6	5	11
France	0	3	3	Syria	0	2	2
Germany	6	11	17	Turkey	0	1	1
Greece	0	1	1	Wales	0	1	1
India	0	1	1				
Ireland	40	24	64	Totals	469	520	989

TABLE 6.—*Residence of New Patients Admitted*

Abington	4	Fall River	30	Monson	1	Southbridge	2
Acton	1	Falmouth	1	Montague	3	South Hadley	1
Adams	3	Fitchburg	6	Natick	3	Springfield	44
Amherst	4	Foxborough	4	Needham	2	Stoughton	2
Ashburnham	1	Framingham	12	New Bedford	45	Swansea	2
Ashland	2	Franklin	16	Newburyport	4	Taunton	40
Athol	6	Freetown	1	Newton	3	Templeton	4
Attleboro	46	Gardner	7	Norfolk	4	Upton	2
Auburn	2	Gloucester	4	North Adams	2	Uxbridge	4
Avon	2	Grafton	2	Northampton	9	Wakefield	1
Ayer	1	Granby	1	North Andover	4	Wales	1
Barnstable	6	Great Barrington	1	No. Attleborough	25	Walpole	10
Bellingham	6	Greenfield	8	Northborough	1	Waltham	3
Blackstone	3	Groton	1	Northbridge	1	Ware	5
Boston	65	Halifax	1	North Brookfield	1	Wareham	2
Bourne	1	Hanover	1	Northfield	2	Watertown	1
Boylston	1	Hanson	2	North Reading	1	Wayland	1
Braintree	4	Haverhill	8	Norton	9	Webster	3
Brewster	2	Holliston	4	Norwood	7	Wellesley	1
Bridgewater	4	Holyoke	13	Oak Bluffs	1	Westborough	1
Brockton	37	Hopedale	1	Orange	3	West Bridgewater	1
Brookfield	1	Hopkinton	1	Palmer	2	West Brookfield	3
Brookline	1	Hudson	1	Peabody	6	Westfield	9
Cambridge	12	Ipswich	1	Pittsfield	10	Westminster	1
Canton	1	Lakeville	1	Plainville	4	West Newbury	1
Charlton	1	Lancaster	4	Plymouth	13	Westport	3
Chelmsford	1	Lawrence	30	Plympton	1	West Springfield	9
Chelsea	2	Leicester	1	Quincy	9	West Stockbridge	1
Chester	1	Leominster	5	Randolph	3	Westwood	1
Chesterfield	1	Lexington	2	Raynham	1	Weymouth	1
Chicopee	12	Lowell	9	Rehoboth	1	Whitman	6
Chilmark	1	Lynn	17	Revere	3	Wilbraham	1
Clinton	1	Malden	1	Rochester	1	Williamsburg	1
Conway	1	Mansfield	6	Rockland	3	Williamstown	2
Dartmouth	1	Marlborough	4	Royalston	3	Wilmington	1
Dedham	13	Marshfield	1	Salem	1	Winchendon	5
Deerfield	1	Medfield	2	Saugus	1	Winthrop	1
Dighton	2	Medford	4	Scituate	2	Woburn	3
Douglas	3	Medway	1	Seekonk	1	Worcester	18
Dudley	1	Methuen	9	Sharon	1	Wrentham	8
Duxbury	1	Middleborough	8	Shelburne	1	Yarmouth	1
East Bridgewater	3	Middleton	1	Sherborn	1	State Institutions	45
Easthampton	1	Milford	15	Shrewsbury	1		
Easton	3	Millbury	1	Shutesbury	1	Total	989
Essex	1	Millis	2	Somerset	1		
Everett	6	Milton	1	Somerville	7		
Fairhaven	1	Monroe	1	Southampton	1		

TABLE 7.—*Stage of Disease of New Patients Admitted*

	Males	Females	Totals
Early	71	75	146
Moderately advanced	179	140	319
Advanced	158	151	309
Non-malignant	61	154	215
Totals	469	520	989

TABLE 8.—*Condition of Patients Discharged*

	Males	Females	Total
Unimproved	144	126	270
Improved	363	552	915
Totals	507	678	1,185

TABLE 9

This table includes all new cases treated, both house patients and out-patients. In some instances, the same patient has been counted twice or more times, according to the varying conditions presented.

	Males	Females	Total
CARCINOMA			
Buccal cavity and pharynx:			
Buccal cavity	9	1	10
Cheek	6	–	6
Floor of mouth	7	–	7
Jaw	4	–	4
Lip	47	1	48
Palate	3	–	3
Pharynx	10	2	12
Tongue	34	5	39
Tonsil	4	–	4
	124	9	133
Digestive tract and Peritoneum:			
Anus	2	1	3
Bile duct	–	1	1
Cecum	2	1	3
Colon	7	–	7
Esophagus	20	2	22
Gall bladder	–	1	1
Liver	1	–	1
Pancreas	5	1	6
Rectum	47	16	63
Sigmoid	12	8	20
Stomach	29	8	37
	125	39	164
Respiratory system:			
Bronchus	9	–	9
Larynx	23	2	25
Lung	8	3	11
Nasal cavity	1	–	1
	41	5	46
Female Genital Organs:			
Cervix	–	100	100
Ovary	–	15	15
Uterus	–	33	33
Vagina	–	2	2
Vulva	–	5	5
	–	155	155
Breast	3	134	137
Male Genitourinary Organs:			
Bladder	17	–	17
Kidney	3	–	3
Penis	9	–	9
Prostate	36	–	36
Scrotum	2	–	2
Testicle	2	–	2
	69	–	69
Skin:			
Ear	9	2	11
Eyelid	5	5	10
Face	75	33	108
Nose	38	12	50
Scalp	1	1	2
Skin (other sites)	19	17	36
Temple	17	5	22
	164	75	239

	Males	Females	Total
Other or Unspecified Organs:			
Antrum	2	–	2
Bladder (female)	–	1	1
Bronchiogenic carcinoma	2	–	2
Kidney (female)	–	2	2
Parotid	2	1	3
Thyroid	2	1	3
Urethra (female)	–	2	2
Primary site unknown	8	2	10
	16	9	25
LYMPHOBLASTOMA, LYMPHOSARCOMA, HODGKIN'S DISEASE	15	7	22
LEUKEMIA	3	1	4
HEMANGIO-ENDOTHELIOMA	–	1	1
MALIGNANT MELANOMA:			
Near anus	–	1	1
Arm	–	1	1
Back	1	–	1
Below ear	–	1	1
Face	3	1	4
Foot	–	3	3
Rectum	–	1	1
Suprascapular region	–	1	1
Thigh	3	–	3
	7	9	16
SARCOMA:			
Unspecified type (axilla)	1	–	1
Adenofibrosarcoma (breast)	–	1	1
Chondrosarcoma (ilium)	–	1	1
Fibrosarcoma:			
Axilla	–	1	1
Groin	1	–	1
Leg	3	3	6
Thumb	1	–	1
Leiomyosarcoma:			
Cervix	–	1	1
Uterus	–	1	1
Liposarcoma (thigh)	1	–	1
Osteogenic Sarcoma:			
Femur	2	2	4
Ilium	–	1	1
Reticulum-cell sarcoma (pharynx)	1	–	1
	10	11	21
MIXED TUMOR, MALIGNANT (parotid):	2	1	3
MALIGNANT TERATOMA (testis):	2	–	2

TABLE 9—*Continued*

	Males	Females	Total
MALIGNANT TUMOR, TYPE UNKNOWN:			
Kidney	1	–	1
Pineal gland	–	1	1
Spine	1	–	1
Thigh	1	–	1
	3	1	4
NON-MALIGNANT TUMORS:			
Adenofibroma	–	16	16
Adenoma	8	1	9
Adenomyoma	–	1	1
Angioma	–	1	1
Cyst	3	8	11
Cystadenoma	–	2	2
Ependymoma	–	1	1
Fibroma	2	1	3
Fibromyoma	–	2	2
Giant-cell tumor, benign	1	2	3
Hemangioma	16	13	29
Hematoma	–	2	2
Leiomyoma	1	44	45
Lipoma	6	9	15
Lipofibroma	–	1	1
Lymphangioma	4	–	4
Mixed tumor, benign	2	1	3
Neuroblastoma	–	1	1
Osteochondroma	1	–	1
Papilloma	19	27	46
Polyp	4	35	39
Tumor, nature unspecified	–	2	2
	67	170	237
RHEUMATIC AND NUTRITIONAL DISEASES:			
General diseases	5	17	22
Diabetes mellitus	1	9	10
Diseases of thyroid	5	20	25
	11	46	57
DISEASES OF BLOOD AND BLOOD-MAKING ORGANS	2	4	6
DISEASES OF THE NERVOUS SYSTEM AND ORGANS OF SPECIAL SENSE:			
Nervous system	7	8	15
Organs of vision	–	2	2
Ear and mastoid	–	1	1
	7	11	18
DISEASES OF CIRCULATORY SYSTEM:			
Circulatory system (general)	46	72	118
Lymphatic system		1	1
	46	73	119
DISEASES OF RESPIRATORY SYSTEM:			
Respiratory System (general)	45	16	61
Nasal fossae and annexae	6	2	8
Larynx	–	1	1
	51	19	70
DISEASES OF DIGESTIVE SYSTEM:			
Buccal cavity and annexae, pharynx and tonsils	50	17	67
Esophagus	1	–	1
Ulcer of stomach and duodenum	40	7	47
Stomach	10	4	14
Intestines	20	47	67
Liver	3	1	4
Gall-bladder and biliary passages	14	45	59
Peritoneum	2	2	4
	140	123	263
DISEASES OF GENITO-URINARY SYSTEM:			
Kidneys and ureters	9	10	19
Bladder	3	22	25
Urethra, urinary abscesses, etc.	1	12	13
Prostate	22	–	22
Male genital organs	9	–	9
Female genital organs	–	158	158
Cysts of the ovary	–	8	8
Breast	–	35	35
	44	245	289
DISEASES OF SKIN AND CELLULAR TISSUE:			
Cornu cutaneum	4	–	4
Keloid	–	1	1
Keratoses	112	62	174
Hyperkeratoses	14	7	21
Sebaceous cysts	6	2	8
Verruca	2	2	4
Other diseases	17	21	38
	155	95	250
DISEASES OF BONES AND ORGANS OF LOCOMOTION	6	12	18
CONGENITAL MALFORMATIONS:			
General diseases	4	2	6
Nevus	6	17	23
	10	19	29
INFECTIOUS AND PARASITIC DISEASES:			
General diseases	1	2	3
Erysipelas	–	1	1
Syphilis	10	5	15
Trichomonas vaginalis	–	8	8
Tuberculosis	19	13	32
	30	29	59
OTHER CONDITIONS	11	35	46
NO DISEASE	11	26	37
NO DIAGNOSIS	40	41	81

Financial Report, Pondville Hospital at Norfolk, 1937

To the Department of Public Health:

I respectfully submit the following report of the finances of this Institution for the fiscal year ending November 30, 1937:

Statement of Earnings

Board of patients:			
Private	$28,328 64		
Cities and towns	60,242 50		
Out-patient department	1,098 00		
Accident cases	22 50		
		$89,691 64	
Personal services:			
Reimbursement from Board of Retirement		$78 74	
Sales:			
Travel, transportation and office expense	$5 91		
Food	367 14		
Clothing and materials	3 60		
Furniture and household supplies	119 72		
Medical and general care	147 20		
Garage, stable and grounds	6 25		
Repairs, ordinary	2 00		
Repairs and renewals (Plans)	10 00		
Miscellaneous—junk	86 87		
Board, special nurse	205 50		
Total sales		$954 19	
Miscellaneous:			
Board and room-maid for Asst. Supt.	$312 00		
Total, miscellaneous		$312 00	
Total earnings for the year			$91,036 57
Total cash receipts reverting and transferred to the State Treasurer			$83,093 77
Accounts receivable outstanding Dec. 1, 1936		$50,299 64	
Accounts receivable outstanding Nov. 30, 1937		$58,242 44	
Accounts receivable decreased			$7,942 80

Maintenance Appropriation

Balance from previous year, brought forward		$4,698 68
Appropriations for current year	$357,850	
		357,850 00
Total		$362,548 68
Expenditures as follows:		
Personal services	$196,561 21	
Food	52,460 63	
Medical and general care	33,946 60	
Heat, light and power	17,477 36	
Garage, stable and grounds	1,989 15	
Travel, transportation and office expenses	10,943 46	
Religious instruction	1,200 00	
Clothing and materials	726 52	
Furnishings and household supplies	18,090 77	
Repairs, ordinary	2,063 94	
Repairs and renewals	7,760 94	
Total maintenance expenditures		$343,220 58
Balance of maintenance appropriation, Nov. 30, 1937		$19,328 10
Estimated outstanding liabilities, Nov. 30, 1937		$2,103 01

Special Appropriations

Balance December 1, 1936, brought forward		$12,166 74
Appropriations for current year:		12,200 00
Total		$24,366 74
Expended during the year (see statement below)	$13,449 40	
Reverting to Treasury of Commonwealth	*8,438 29	
(Star balances below that are reverting)		21,887 69
Balance November 30, 1937, carried to next year		$2,479 05

Appropriation	Act or Resolve	Total Amount Appropriated	Expended during Fiscal Year	Total Expended to Date	Balance at End of Year
Mass. State Project H-6 P.W.A. Docket 4200	1934	$95,425 00	$762 53	$95,425 00*	
Mass. State Project H-5 P.W.A. Docket 4476	1934	221,400 00	1,690 69	221,255 94†	$144 06
Improvements—Water Supply System	1936	500 00	25 80	288 68	211 32
Service Building Renovations, etc.	1935) 1936) 1936)	12,500 00	370 25	12,040 78	459 22
Improvements, Sewage Disposal	1937)	4,500 00	3,177 73	4,113 15	386 85
Roads and Parking Space	1937	8,700 00	7,422 40	7,422 40	1,277 60
Gross		$343,025 00	$13,449 40	$340,545 95	
Less amounts reverted to State Treasurer				8,438 29	
Net		$343,025 00	$13,449 40	$340,545 95	$2,479 05

*Of this amount $1,310.50 reverted to the State Treasurer.
†Of this amount $7,127.79 reverted to the State Treasurer.

Per Capita

During the year the average number of patients has been		131 6
Total cost of maintenance	$343,220 58	
Equal to a weekly per capita cost of (52 weeks to year)	50 15	
Total receipts for the year	83,093 77	
Equal to a weekly per capita of	12 14	
Total net cost of maintenance for year (total maintenance less total receipts)		$260,126 81
Net weekly per capita	38 01	

Respectfully submitted,

(signed) Marion M. Whalen,
Treasurer.

Inventory: Pondville Hospital at Norfolk

GRAND SUMMARY SHEET

November 30, 1937

Real Estate

Land, 324.2 acres	$14,418 50	
Buildings	760,773 88	
Betterments (additions and improvements)	22,191 91	
Total, Real Estate		$797,384 29

Personal Property Undistributed Supplies

(Total of Departmental Sheets)

Travel, transportation and office expenses	$1,664 90	
Food	4,581 64	
Clothing and materials	1,521 01	
Furnishings and household supplies	8,840 49	
Medical and general care	26,927 49	
Heat, light and power	5,318 15	
Farm		
Garage, stable and grounds	100 15	
Repairs	8,245 55	
		$57,199 38

Personal Property Distributed Supplies

(Total of Departmental Sheets)

Travel, transportation and office expenses	$7,743 16	
Clothing and materials	1,418 41	
Furnishings and household supplies	78,922 19	
Medical and general care	59,420 07	
Heat, light and power		
Farm		
Garage, stable and grounds	8,681 29	
Repairs	4,449 72	
Total	$160,634 84	
Less 5% depreciation	8,031 74	
		$152,603 10

Grand Summary

Real Estate—Total	$797,384 29	
Personal Property—Undistributed Supplies, Total	57,199 38	
Personal Property—Distributed Supplies, Total	152,603 10	
Radium in Emanation Plant	69,880 30	
Grand Total		$1,077,067 07

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